DOCUMENT RESUME

ED 084 207 SO 006 631

AUTHOR	Alexander, Karl; Eckland, Bruce K.
TITLE	Effects of Education on the Social Mobility of High School Sophomores Fifteen Years Later (1955-1970): Explorations in Equality of Opportunity. Final Report.
INSTITUTION	North Carolina Univ., Chapel Hill. Inst. for Research in Social Science.
SPONS AGENCY	National Inst. of Education (DHEW), Washington, D.C.
BUREAU NO	10202
PUB DATE	Nov 73
GRANT	OEG-4-71-0037
NOTE	249p.
EDRS PRICE	MF-$0.65 HC-$9.87
DESCRIPTORS	Academic Ability; Aptitude; Data Analysis; *Educational Benefits; *Educational Experience; Educational Opportunities; Educational Research; High School Students; Literature Reviews; Models; *Occupational Aspiration; Research Methodology; Sex Differences; *Social Mobility; Social Status; *Student School Relationship; Surveys
IDENTIFIERS	Educational Attainment

ABSTRACT

Designed to explore the determinants and long-range consequences of individual mobility in the U.S., the Explorations in Equality of Opportunity Project is a longitudinal survey of 2,077 students who were tested by the Educational Testing Service (ETS) as sophomores in 42 public high schools in 1955 and who were followed up by the Institute for Research in Social Science (IRSS) in 1970. This report deals with the educational attainment process. It focuses on sex interactions and within-school process variables, including school-wide context variables. The unique effects of different measures of family social status are retained throughout the analysis and aptitude is included in most models as an exogenous variable. Earlier findings on the effects of status background, ability, and within-school variables on educational and occupational attainment were largely supported. Extensions of these basic models produces some important results, particularly in the analysis of high school contextual effects. Wheras a high status background context was found to enhance academic performance, a high ability context was found to depress academic performance. Since the two context variables themselves are positively related, their effects largely offset one another. (Author)

ED 084207

FINAL REPORT

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EFFECTS OF EDUCATION ON THE SOCIAL MOBILITY OF HIGH SCHOOL SOPHOMORES FIFTEEN YEARS LATER (1955-1970)

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SP006631

November 1973

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
National Institute of Education

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ABSTRACT

Designed to explore the determinants and long-range consequences of individual mobility in the U.S., the Explorations in Equality of Opportunity Project is a longitudinal survey of 2,077 students who were tested by ETS as sophomores in 42 public high schools across the nation in 1955 and who were followed up by IRSS in 1970. This report deals with the educational attainment process. It focuses on sex interactions and within-school process variables, including school-wide context variables. The unique effects of different measures of family social status are retained throughout the analysis and aptitude is included, in most models, as an exogenous variable.

Duncan and Blau's, Eckland's, and Sewell's earlier findings on the effects of status background, ability, and within-school variables on educational and occupational attainment were largely supported. Extensions of these basic models produced some important results, particularly in our analysis of high school contextual effects. Whereas a high status background context was found to enhance academic performance, a high ability context was found to depress academic performance. Since the two context variables themselves are positively related, their effects largely offset one another.

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EXPLORATIONS IN EQUALITY OF OPPORTUNITY

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The research reported herein was performed pursuant to a grant with the National Institute of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official National Institute of Education position or policy.

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CHAPTER 1

HIGHLIGHTS

The second chapter of this report describes the basic theoretical model and literature that has guided this project since its beginnings in 1966. Chapters 3, 4, and 5 present in detail the methods, strategies and techniques of analysis that were employed. The remaining chapters present the results of the basic attainment model and its extensions. Below is a summary of the highlights of these results.

- A replication of Blau and Duncan's basic attainment model (1967) produced remarkably consistent results in regard to the effects of status background variables (father's education and occupation) on both educational and occupational attainments:
    - Educational attainment is the major determinant of occupational status.
    - Education is a more powerful predictor of present (age 30) than early occupational status.
    - The direct or delayed effects of family status variables on occupational status are minimal.
    - The influence of status background variables on occupational status are important, however they operate mainly through educational attainment.
    - In contrast with Blau and Duncan's results, education is less influenced by family background variables and plays a greater role in determining occupational status. We interpret this difference to reflect the diminishing effects of ascriptive factors (historically) in the status attainment process over time.
- The addition of other family status background variables into the model (i.e., mother's education, household items, family income, and neighborhood composition) reveals a marked tendency for some of these variables to have offsetting (negative) effects on the dependent variables. Thus, the net

positive influence of the background variables is generally less than would be anticipated under the assumption that all such factors are positively related to attainment variables under all circumstances. They are not.

- Academic aptitude when introduced into the model exceeds slightly the effects of the background status variables. Similar to the effects of background status, its effects on occupational outcomes operate indirectly through educational attainment.

- Introducing early educational expectations into the model does not significantly alter the amount of variance in occupational outcomes explained (which ranges from 40 to 60 per cent), but helps to explain the effects of aptitude and background variables. About half of the direct effects of aptitude and family status on educational attainment are mediated through educational expectations.

- With one exception, Eckland's previous research results and speculations (1965) on the differential effects of ability and family status variables at different stages of the educational cycle are supported:
    - For college graduates, the effects of ability clearly surpass the negligible status background paths to occupational status.
    - For college dropouts, the effects of social origins on occupational status are still important whereas the effects of academic ability are inconsequential.
    - For high school graduates, both ability and status background variables have modest effects on occupational attainment (the exception).

- A replication and extension of Sewell's analysis (1969, 1970) of within-school process variables (i.e., peer college plans, class standing, parental and teacher-counselor contact about college plans, and academic self-concept) produced remarkably similar results:
    - The direct influence of all within-school variables on occupational attainments are minimal, their effects being mediated through educational expectations and attainments.

  - Family background status has negligible effects on academic performance.
  - Educational expectations is much more a function of status background and various interpersonal influences than of either academic ability or grades.
  - Family influence has a greater impact on the dependent variables than either peer relations or teacher-counselor contacts, with the latter the least important of the "significant other" variables.

- The introduction of sex into the educational attainment model increases the amount of variance explained in both school process and outcome variables:
  - Notable positive sex effects for women occur in relationship to academic performance and self-concept in high school.
  - Negative sex effects for women occur in relationship to enrollment in a college-preparatory curriculum and educational attainment, the latter remaining despite simultaneous controls on status background variables, academic ability, school performance, educational expectations, academic self-concept, the influence of significant others, and curriculum enrollment.
  - Status background influences are more determinant of high school process and outcome variables for women than for men, whereas ability is more important for men.
  - At the college level, family status influences are quite similar for both sexes, whereas academic ability remains considerably more important for the educational attainments of men.

- High school ability context and social status student body composition have opposite and, thus, offsetting effects on educational expectations and attainments:
  - Schoolwide status background context enhances the likelihood of having college-oriented peers which, in turn, is related to academic performance and college plans.
  - Ability context has a direct depressant effect on academic performance and self-concept which, in turn, are related to educational expectations and attainment.

  - Since the ability effect is depressant and the status effect is salutary, the mediated influences of these two context variables on subsequent dependent variables are largely offsetting.

- In the transition from school to college, high school status composition and curriculum enrollment have enduring effects:

  - Having been previously enrolled in a college preparatory curriculum has a modest positive influence on academic self-concept in college and choice of a high-performance major.

  - High school status composition enhances the likelihood of attending a selective college and is positively related to educational attainment.

  - High school aptitude context has no transitional effects.

- Consistent with Drew and Astin's conclusions (1972), the net effect of attending a selective college is salutary. College selectivity has a modest negative effect on freshman grade averages but a more than offsetting direct and positive effect on educational attainment.

CHAPTER 2

EDUCATIONAL ATTAINMENT MODELS AND SOCIAL MOBILITY

The study of educational and occupational attainment and mobility processes has been a topic of enduring interest to sociologists. Much of this interest seems to involve, at least implicitly, a concern with assessing the relative importance of ascribed and achieved factors in these processes. Educational experiences assume a critical role in determining the importance of such factors for subsequent attainments. They can serve either to reinforce occupational selection on the basis of ability or to maximize the intergenerational transmission of advantage (Turner, 1960). Consequently, the role of educational institutions in this sorting and selection process has occupied a prominent position in occupational mobility and stratification research.

As a reflection of this prominence, analytical and policy orientations seem to converge upon the educational system as an object of inquiry. In light of the importance of educational attainments for occupational success in complex industrialized societies, the internal functioning of educational institutions has been scrutinized to see if it fulfills the promise of "equality of educational opportunity" (Coleman, 1966) implied in our democratic ethos. At a more purely analytical level, numerous studies have examined the place of educational attainment variables in complex models predicting outcomes at various career stages. Often educational attainments or aspirations are the dependent variables in such analyses; in more comprehensive models, educational variables intervene between background factors and occupational attainments.

As we progress to a more detailed discussion of previous literature, we shall have occasion to specify the content of these factors, as well as note social-psychological variables which intervene in the model. At this point, however, it is sufficient to note the general themes which have dominated this research.

Previous literature examining career processes and occupational attainment is indeed voluminous. Much of the early research in this area has been summarized by Lipset and Bendix (1959). Cumulatively, considerable information has been provided by these endeavors, and they have added much to our knowledge of factors affecting educational and occupational attainments. Many of the research projects contributing to this store of information are quite impressive by current sociological standards. We continually lament the paucity of longitudinal analyses available to us to facilitate the making of causal inferences. This substantive area is, however, fortunate to include among its empirical inquiries a number of large-scale longitudinal studies. Nevertheless, any research project suffers from limitations on its definitiveness and generalizability, and the major recent contributions in this field are no exception.

The Coleman Report (1966), although massive in scope, is essentially a cross-sectional analysis and lacks an early measure of student ability, thus making it impossible to separate out school effects on academic achievement and self-concept from biases in the initial distribution of students to schools. Blau and Duncan's study of the American occupational structure (1967), although once again quite impressive in scope and design, contains neither a measure of ability nor social-psychological attitudinal indices. Although this was necessary because of limitations imposed on them in their use of the Census Bureau's March, 1962 Current Population Survey sample, it nevertheless remains a major limitation of their project. Sewell's 1957 study of Wisconsin high school seniors suffers from a geographically restricted sample and a follow-up study of relatively short duration (only seven years). Thus, many of the respondents in their sample had only recently completed their formal education and, hence, had not yet had the opportunity to establish stable career patterns. Finally, the 1961 NORC study of college seniors (Davis, 1964) provides relatively little information about early educational experiences, employs an educationally select sample, and has only three year follow-up data. Again, this is not long enough to permit many in the sample to establish careers.

Despite the wealth of information generated by these and other research projects, the design limitations just mentioned make desirable replications and extensions of their inquiries on data which do not suffer from these disabilities. The 1970 EEO Survey ("Explorations in Equality of Opportunity"), directed by Dr. Bruce Eckland, provides just such an opportunity.

These data cover a fifteen year time span, beginning in 1955 with a national sample of high school sophomores and seniors. The 1955 data include a test of academic aptitude, and information on educational and occupational aspirations, family background characteristics, peer, parental, and teacher influences on educational goals, reasons for holding particular goals, and knowledge and interest in various scholarship opportunities. The 1970 follow-up data provide a wealth of information on educational and occupational experiences, migration patterns, marital history, and a wide variety of attitudinal items.

These data, then, have a number of extremely desirable features in comparison with previously employed data sets. The large number of sophomores in the sample permits analysis of attrition in relation to various ability and family status variables. Mobility studies which employ samples of seniors, such as Sewell's high school study or Davis' analysis of college seniors, do not permit analysis of factors operative at the first formal termination point in the educational process, the dropping out of school after the age of compulsory attendance but before high school graduation. 1960 census data indicate 86 percent of those males finishing the 5th grade completed some high school, while 74 percent of those completing some high school eventually graduated. These figures varied significantly by social class background, family income, and ethnicity (Folger and Nam. 1965: 24-29). The results of studies which address themselves to the relationship between social class, ability, and educational goals and achievements, without data on this early selection stage, should be employed cautiously.

The fifteen year time span covered by the EEO survey data is another asset of the data set. This duration will allow us to follow the sophomore sample through high school graduation, a typical four year college career, and even three or four years of graduate education, and still have information on four or five years of early occupational experiences. We shall have thirteen years of occupational history for those who terminated their formal education at high school graduation. Given the length of the educational and occupational history encompassed in these data, we can not only attempt a replication of previous analyses, but we shall also be able to examine the more enduring effects of factors found to be predictive of outcomes in shorter time spans.

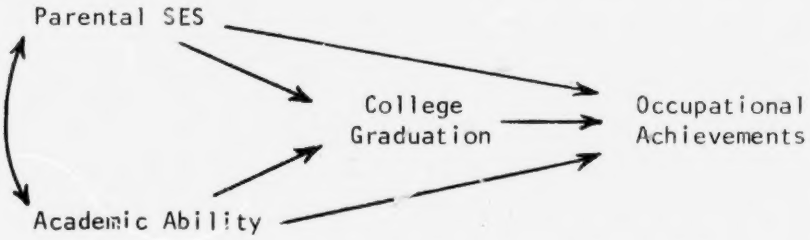
Finally, the fact that we are working with a national sample should facilitate generalization of our findings, and be particularly advantageous for the replication aspects of our analysis. At this point, the fortuitous timing of the initial sample selection becomes relevant. Those students in our sample who progressed through the educational system without interruption would have been seniors at the time that Sewell's high school seniors were sampled (1957) and would have been college seniors at the time of the NORC study of college seniors (1961). Given the restricted geographical representation of the Wisconsin sample and the short time span and educationally limited nature of the NORC study (i.e., college seniors only), our data seem particularly well-suited to fill some of the "gaps" left by previous research in these areas.

Our primary interest in this report lies in a replication of previous analyses and in extending these analyses in specific ways, including a detailed analysis of sex effects and of educational-environmental contextual effects on goal-setting and actual achievements, both educational and occupational. Since this analysis will focus on a relatively narrow aspect of attainment processes, and since contextual variables although not sex effects should be expected to explain, at best, relatively small amounts of the variance in the dependent variables of interest (Meyer, 1970: 59; at worst, such results might be purely artifactual, Hauser, 1970), we shall begin by examining the more general mobility and attainment process literature and to the development of our preliminary model, which summarizes some selected features of these processes.

Attainment Literature and Models

Any attempt to summarize a vast body of literature in a relatively brief amount of space is bound to do an injustice to many of the subtler points and minor contradictions to be found in that literature (hopefully this is not the case for prominent points and major contradictions). We make no pretenses to attempt an exhaustive review of the attainment literature here, for such a task would be a major project in itself. Rather, we shall review some of the major themes in the mobility and attainment literature, and employ these as the rationale for constructing our models.

Eckland's model (1965) provides a useful starting point for this review. Eckland presents a four variable model of the occupational attainment process which can be diagramed as follows:



Note: In this model, as in all that follow, a double-headed arrow indicates a relationship between two variables with no assumptions regarding a causal priority in that relationship.

In it, two background factors, parental SES and academic ability, are thought to affect college graduation (or, more generally, educational attainments), which, in turn, affects occupational achievements. Both background factors also have a direct influence on occupational status, independent of their influence mediated through educational accomplishments. In Eckland's ten year follow-up study of 1952 freshmen at the University of Illinois, most of the effects of the parental status and ability variables were mediated through educational attainments. Ability seemed to have an enduring effect for college graduates by influencing graduate education experiences; whereas, social class background had a persistent effect on the occupational achievements of the college dropouts. Nevertheless, the greatest impact of both variables was mediated through educational achievement. The fact of college graduation, regardless of ability or background characteristics, was the principal determinant of high occupational status. A large number of other achievement analyses have similarly demonstrated the importance of educational attainments in mediating the effects of various background factors (Blau and Duncan, 1967; Duncan and Hodge, 1963; Sewell, Haller, and Portes, 1969; Sewell, Haller, and Ohlendorf, 1970).

On the other hand, it should be noted that most of these studies are based on the educational attainments of at least high school graduates, thereby ignoring the influence of background variables at relatively low levels of formal education. In addition, a number of studies have indicated an enduring, if modest, direct influence for such factors on later accomplishments (Anderson, 1961; Duncan and Hodge, 1963; Eckland, 1964; Sewell and Shah, 1967).

Given this apparent importance of educational attainment for later accomplishments, factors affecting enrollment and graduation at various educational levels merit, and have received, considerable attention. Wolfle's often repeated conclusions seem to be a reasonably accurate reflection of more recent findings (1954: 163):

> Economic and social factors play an important role in helping determine which children graduate from high school and enter college. The differential is less marked, however, for children of superior ability than for those of lesser ability.... After entering college, the situation changes. The student who gets into college has already overcome most of whatever handicaps his home environment offered; once there his chances of graduating are much more dependent upon his ability and much less upon his family background than were his chances of entering into college in the first place.

Similar sentiments are expressed by Folger and Nam. In summarizing their analysis of 1960 census data and their review of other relevant literature, they conclude that (1965: 60) ". . . socioeconomic status has small to moderate independent effects at all points (in the educational selection process) . . . but its strongest effect is probably at college entrance. Ability is an exceedingly important factor after compulsory school ages, being the principal factor related to graduation from high school and college."

The effects of both ability and social status on school attrition are evident at the lower levels of educational attainment. Folger and Nam (1965) report that in 1959 2 percent of the potential high school seniors in the top half of the IQ distribution and 39 percent of those in the bottom half never reached their senior year (p. 27). Attrition is similarly selective with regard to parental educational levels, and within these levels, to family income (p. 21).

The diminishing role of social status factors in influencing outcomes at higher educational levels, given enrollment, is reasonably well documented. Nevertheless, there is some evidence which indicates a continuing direct effect for parental social status, at least through college graduation (Sewell, Haller, and Straus, 1957; Eckland, 1964). Eckland's research (1964) indicates that previous findings of no relationship between social origins and college graduation may be a function of research design limitations. In his study, only 28.5 percent of the freshmen sampled in 1952 graduated in four years from the same institution in which they had initially enrolled; 45.7 percent either transferred, dropped out and returned later, or took more than four consecutive years of attendance to graduate. When these students are taken into account, socioeconomic status indices are significantly related to graduation rates.

At still higher educational levels, even ability seems to have a relatively weak independent effect on educational plans, in this case graduate school attendance (Spaeth, 1970). It would seem that at this level, variations in both social class and ability have been so reduced that other, more subjective motivational factors assume increasing importance in predicting educational outcomes. In the 1961 NORC data, sex was almost as important a predictor of graduate school plans as was academic performance, and socioeconomic status maintained a modest relation to these plans (Davis, 1964: 81-100). Despite the importance of educational performance in influencing graduate study plans, fully 22 percent of those planning to attend and 10 percent of those already accepted were in the bottom half of the academic performance index. It seems obvious, then, that factors other than ability and class background play an important role in the educational selection process.

A major complexity which has been added to these models is the introduction of social-psychological motivation factors to mediate the effects of these ability and background variables on outcomes. We anticipate that these motivational elements will assume greater importance in the educational attainment process as ability selection at higher educational levels weakens the explanatory utility of these more "objective" background and aptitude-ability measures.

It has been noted that enrollment in a college-bound curriculum is a major point of differentiation in the academic sorting and later attainment processes (Parsons, 1959). Folger and Nam (1965: 51) found that, among the variables included in their analysis, enrollment in the college preparatory curriculum was the single variable most highly related to college attendance. Since various background and ability variables could not account for all of this relationship (by explaining curriculum choice), they conclude that other motivational processes must be involved. Indeed, some have even argued that motivational factors best explain inequalities in educational achievement in the high school-college transition (Jencks, 1968; Wolfle, 1954: 157-158). It is to be expected that similar factors are operative at the college level. Indeed, Spaeth (1968; 1970) found freshman prestige expectations to be better than GPA in predicting senior expectations, and senior expectations to be better than GPA in predicting graduate school enrollment. Consequently, a number of studies have investigated factors affecting goal setting (particularly educational and occupational aspirations and plans), as well as the role of these and other motivational influences on attainments.

Achievement motivation has been found to be related to upward occupational mobility among youth from lower class and lower middle class backgrounds (Crockett, 1969; Elder, 1968). Often this mobility is achieved independently of formal educational accomplishments. Where mobility is primarily a function of high educational attainments, mental ability and class background seem to play a greater explanatory role. "Need for Achievement" will not be included in our analysis. For a critique of the literature employing this concept, see Lipset and Bendix (1959: 247-248). A more recent critical evaluation of achievement motivation research methodology is developed by Entwisle (1972).

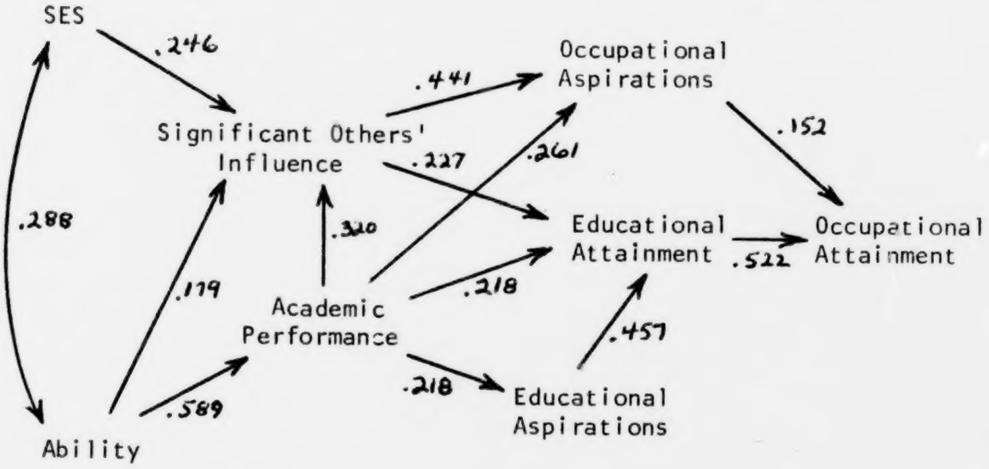
Various studies have demonstrated the independent effects of both parental social status and ability on college plans, expectations, and aspirations (Folger and Nam, 1965; Sewell, Haller, and Straus, 1957; Sewell and Shah, 1967, 1968; Rehberg and Schafer, 1970; Cramer, Bowerman, and Campbell, 1966). In some, family background status and values are accorded the greatest importance (McDill, Rigsby, and Meyers, 1969; Kahl, 1961; Ellis and Lane, 1969); others point to the primacy of ability factors (Davis, 1964: 100; Spaeth, 1968; Sewell and Shah, 1967). Finally, there is some evidence indicating differences by sex in the relative importance of these factors (Sewell and Shah, 1967). Regardless of what factors are accorded major importance in influencing goal levels and aspirations, there is considerable evidence which indicates that these motivational factors mediate much of the effects of the gross background and ability factors already discussed (Spaeth, 1968, 1970; Sewell, Haller, and Portes, 1969; Sewell, Haller, and Ohlendorf, 1970; Sewell and Shah, 1967).

More interpersonal variables have been introduced into the study of attainment processes in an attempt to explain these levels of aspirations and expectations. In the analysis of goal setting, background variables, such as parental status, become rather gross measures of a multitude of interpersonal interactions. There have been a number of attempts to specify the dynamics of goal setting processes further by referring to the influences of various significant others and reference groups on motivations and apsirations. Both Kahl (1961) and Ellis and Lane (1969) emphasize the importance of parental support and encouragement in influencing the educational goals and accomplishments of lower class youth (with Kahl concluding that paternal pressure is of primary importance, and Ellis and Lane focusing on maternal and extra-familial influences). Others (Herriott, 1963; McDill and Coleman, 1965) emphasize the role of peer influences on motivation and goal setting.

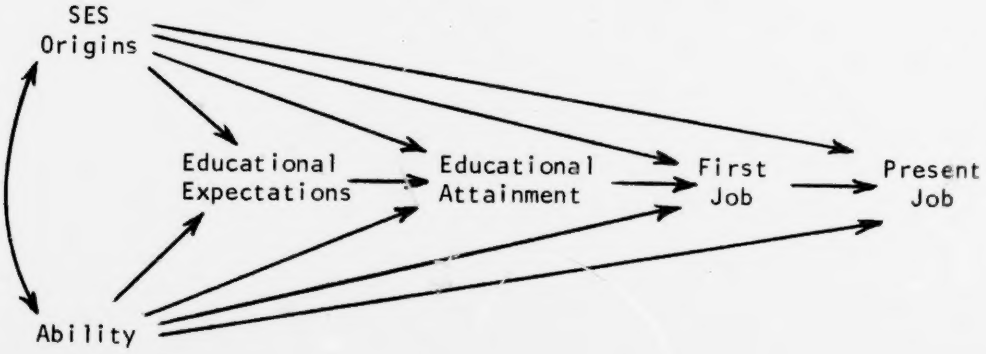
More recent inquiries (Sewell, Haller, and Portes, 1969; Sewell, Haller, and Ohlendorf, 1970) demonstrate the gross effects of the composite influences of peers, parents, and school teachers and counselors on both aspirations and attainments. In the 1970 analysis, the direct path coefficients for these influences on occupational and educational aspirations and educational attainments were .441, .508, and .227 respectively. These direct effects were stronger than those for any other variable in relation to aspiration levels (with academic performance having the next strongest effect, with respective coefficients of .261 and .218), and were exceeded only by educational aspirations in relation to educational attainments (which had a direct path coefficient of .457).

Attempts to assess the relative importance of various interpersonal influences indicate an independent effect for both parental and peer pressures (Haller and Butterworth, 1960), that parental and peer influences often correspond (Kandel and Lesser, 1969), and that when they do correspond their effect is maximized (Kandel and Lesser, 1969; Simpson, 1962). When these influences are discordant, parental influences seem predominant; when they are concordant, they assume a greater importance than class membership in relation to educational plans and aspirations (Kandel and Lesser, 1969; Simpson, 1962).

The complex interactions of all these variables have been summarized in the path model presented by Sewell, Haller, and Ohlendorf (1970):


SES
.246
Occupational Aspirations
.441
Significant Others' Influence
.227
.261
.152
.288
.320
Educational Attainment
Occupational Attainment
.522
.179
Academic Performance
.218
.457
.218
Educational Aspirations
.589
Ability

A fuller discussion of these more subjective-interpersonal variables will be deferred until the contextual analysis, which is our major substantive concern. At this point, we will restrict our attention to a simple extension of Eckland's basic model (1965) discussed earlier. Our only elaboration of this model involves the inclusion of both short- and long-term occupational attainments and the mediating role of educational goal orientations:



We would expect the principal influence of background and ability variables to be exerted through their direct effects on career goals and educational attainments. On the basis of previous research findings, we expect that the direct effects of background and ability factors on occupational attainments will interact with level of education obtained. In particular, at lower levels of educational attainments, a more enduring influence for social origins is expected; at intermediate levels (some college, for example) we hypothesize a more pronounced and prolonged influence for both ability and family background; at the highest levels of educational attainment, we would expect the influence of various background factors to be minimized (at least partially due to the reduction in their variation). In order to examine these differential effects, we shall perform separate analyses of the factors affecting occupational outcomes at each level of formal educational attainment.

Contextual Effects: Introduction

Analysis of the effects of school composition on academic performance, aspirations, and outcomes is consistent with a tradition of sociological inquiry in other institutional areas and focusing on other dependent variables. The social context of collegiate (Newcomb, 1958) and military (Merton and Rossi, 1957) environments have been found to exert an influence on the values and aspirations of their participants. These influences are most often interpreted within a reference group framework, employing concepts such as "anticipatory socialization" and "relative deprivation" to explain subjective states. Reference group theories have similarly been used to explain the existence of occupational values and aspirations that are discrepant with what would be expected on the basis of class origins (Hyman, 1953).

We have already noted that significant differences in levels of occupational and educational aspirations by class background are well-documented in the research literature. Research into peer and parental influences on goal levels, sometimes explicitly employing a reference group framework (Simpson, 1962), has attempted to account for much of these differences (McDill and Coleman, 1965; Herriott, 1963; Sewell, Haller, and Portes, 1969; Sewell, Haller, and Ohlendorf, 1970; Simpson, 1962; Haller and Butterworth, 1960; Kandel and Lesser, 1969; Ellis and Lane, 1969; Kahl, 1961).

Beyond such interpersonal influences, however, there is a considerable body of literature which attempts to document purely structural or contextual effects on academic performance and aspirations. Often explanations are offered in terms of "normative climates" in such studies (Wilson 1959) and consequent peer influences (Campbell and Alexander, 1965); but sometimes no such allusions to mediating interpersonal influences are made, and social-structural factors are thought to have direct effects, either through establishing a particular milieu or providing educational facilities that promote high achievements (Boyle, 1966; Meyer, 1970).

Most of the studies examining these contextual effects have employed either college plans or educational aspirations as the dependent variable and some measure of school or community social class composition as the principal independent variable (Nelson, 1972; Turner, 1964; Wilson, 1959; Michael, 1961; Sewell and Armer, 1966; Boyle, 1966; Meyer, 1970; Campbell and Alexander, 1965; Cleveland, 1962; Cramer, Bowerman, and Campbell, 1966).

In many of these studies, the context measure consists of some average of the family background characteristics of the students included in the sample (this procedure implies a lack of independence between the individual and context status measures, but the larger the sample size, the less problematic such covariance should be, Michael, 1966: 702). Indeed, Hauser (1969) has demonstrated that much of the between-school variation in student performance and aspirations can be attributed to differences between schools in the composition of their student bodies. Although Hauser interprets such results as casting doubt on the validity of school, or "quality of education," effects on educational outcomes, it is exactly these compositional differences, at the aggregate level, which many have assumed influence outcomes and which are commonly referred to as "contextual" variables. Since such variables are actually aggregate measures of individual traits, perhaps their designation as "structural" or "contextual" is a misnomer (this is the reason that Tannenbaum and Bachman, 1964, prefer the term "compositional"), but we shall follow established convention in employing this terminology.

Most of the studies listed above, employing a variety of individual level controls and techniques of analysis, have found a modest direct effect of social class composition on educational plans and goals. One exception (Wilson, 1959) found that the structural influences actually exceeded those for the individual status measure (Boyle, 1966a: 629). Studies in which no effects for measures of social class composition were found will be discussed shortly.

Different sets of independent and dependent variables have been employed in a variety of other contextual analyses. Some have examined the effects of both class and racial context on actual achievements, as well as their more subjective consequences. Included among these research endeavors would be the monumental Coleman Report (1966), the United States Commission on Civil Rights' reanalysis of the Coleman data (1967, hereafter referred to as USCCR), and Wilson's longitudinal study included in the USCCR Report (1967). Others have restricted their attention to the effects of racial composition on educational plans and various indices of self-evaluation (St. John, 1966; 1971); to the effects of community size on educational plans (Rogoff, 1961; Boyle, 1966); to the effects of aspiration context on educational plans (Cramer, Bowerman, and Campbell, 1966); and, finally, to the effects of school selectivity and ability contests on career choice (Davis, 1966), career mobility (Perrucci and Perrucci, 1970), educational goals (Drew and Astin, 1972), and college graduation (Wegner and Sewell, 1970).

This list of research projects encompasses a broad range of specific topics, research designs, design adequacies, and interpretive acumen. It would be fruitless to apply any summary generalizations to the entire set, and not particularly useful, given our purposes, to embark upon a detailed discussion of each. The brief description of general topics provides some idea of the range of interests that have been explored through contextual analyses of educational institutions. We shall provide a more detailed discussion only of those that are of particular substantive interest to us or that have received critical attention that merits note in our project. Of those studies mentioned in the above paragraph, only St. John (1966) has obtained consistently negative results.

We shall first address ourselves to some of the criticisms directed at these studies, The Coleman Report in particular, and then turn to a consideration of the criticisms of contextual analysis in general. Finally, we shall develop our own substantive interests, drawing particularly upon the Davis "Frogpond" thesis (1966) and the Campbell and Alexander two-stage model of structural effects (1965).

Critique of Contextual Analyses

The controversial Coleman Report findings have received the most critical attention of any of the contextual analyses presented above. This is probably at least partially a consequence of the nature of its findings, which bring into question some of the most fundamental beliefs of many educators and policymakers regarding the efficacy of various types of "educational hardware" in promoting high achievement (Moynihan, 1968; Bowles and Levin, 1968).

Bowles and Levin (1968: 4-5) summarize the Report's conclusions regarding the relation of school and student characteristics to achievement as follows:

> 1. Per pupil expenditures in the library and a number of other facilities and curricular measures show very little relation to achievement if the social backgrounds and attitudes of individual students and their schoolmates are held constant.
>
> 2. The effect of a student's peers on his own achievement level is more important than any other school influence.
>
> 3. There is a small positive effect of school integration on the reading and mathematics achievement of Negro pupils after differences in the socio-economic background of the students are accounted for.

In addition to finding positive effects on black achievement scores with increasing percent white and percent high SES students in the school (the latter accounting for most of the effects of the former), the report finds that "sense of control" is positively related to these factors; whereas, academic self-concept is negatively related to them. Katz (1968) interprets these results as indicating that the "will to learn" among disadvantaged pupils is heavily dependent upon the influence or role models in the classroom. He finds it encouraging that the negative consequences of these experiences for one's self-concept do not override their potentially positive consequences for achievement. St. John (1971) has obtained similar results regarding the consequences of integrated educational experiences for sense of control and academic self-concept among black students. The USCCR study (1967) documents a racial contextual effect on achievement for classroom, rather than school, contexts, and Wilson's longitudinal study (1967) confirms Coleman's finding of a school SES effect (particularly for earlier educational experiences), but does not find an independent effect for racial composition.

Much of the reaction to the Coleman Report has focused on the apparent unimportance of school factors[1] and racial composition in accounting for student achievement.[2]

Many of the criticisms of the Coleman Report research design are not specific to the contextual effect analysis. These would include observations regarding inadequate measures of school facilities, sampling problems of school self-selection, high nonresponse rates on critical items (particularly those to be employed in the student social status measure), and overreliance on a single measure of verbal ability as a dependent variable (Bowles and Levin, 1968; Wilson, 1968; Dyer, 1968). The criticisms more central to our concern involve the cross-sectional nature of the design which permits biases of selection to be confounded with actual contextual effects (Dyer, 1968; Pettigrew, 1968; Wilson, 1968; Bowles and Levin, 1968) and the possibility of inadequate controls on theoretically relevant individual level variables (Bowles and Levin, 1968).

Regarding selection biases, Wilson (1968: 80) asserts that, "Clearly . . . the gross disparities in achievement between children attending different schools are to a large extent -- or perhaps entirely -- due to prior differences between students aggregated in separate attendance areas: differences in native ability; contrasting preschool socialization and continuing family influences; and diverging extra-school peer and neighborhood influences." The last of these might legitimately be considered the mediation of contextual effects (Campbell and Alexander, 1965), but without adequate control strategies for eliminating the other alternative explanations, their influences are potentially confounded with "true" contextual effects and we have no basis for assessing the relative merits of these competing explanations.

Without longitudinal data, or at least early measures of ability, achievement, self-concept, or whatever the dependent variable, such analyses are always susceptible to the criticism of sample self-selection. In the case of the Coleman Report, it is arguable that low status, or "deprived," or black students attending predominantly high status schools score higher on achievement tests, not because of the influence of the school environment, but because they were initially atypical low status or black children.

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[1] Dyer, 1968, reviews a number of earlier studies which do find various school characteristics to be of importance; McDill, Rigsby, and Meyers, 1969, present some data which supports the Coleman Report.

[2] Those committed to the goal of integrated education can accomodate themselves to the latter result by arguing that integration is still necessary to achieve social class heterogeneity, Pettigrew, 1968.

This is attested to by their very presence in a predominantly high status school. Perhaps their parents were particularly sensitive to the necessity of a good education and moved into a particular school district with this in mind. Such parental motivation might well be reflected in their socialization of their children and might affect the student's perception of their aspirations for him (Furstenberg, 1971), hence influencing his own aspirations and motivation. We have no way of assessing how frequently this or other such sources of bias occur, yet without acceptable early measures we cannot reject the possibility that these sorts of sample biases really explain differential contextual outcomes.

It is also necessary to control for theoretically relevant individual level variables if one is to infer contextual effects (see below). In the case of the Coleman Report, student social status certainly qualifies as a "theoretically relevant" variable, and calling into question the adequacy of the report's control on individual social status calls into question the validity of the report's contextual effects. Bowles and Levin (1968: 17-21) question the adequacy of parental level of education as an indicator of social status for Negroes. If this is indeed the case, and considerable uncontrolled variation in individual levels of social status is confounded with the effects of their contextual variables, then, once again, reasonable alternative hypotheses are available to call into question the presumed contextual effects. Note, however, that we are advocating the adequate control of "theoretically relevant variables," not the indiscriminate partialling of every readily available individual level variable.

At least three of the studies of the effects of status context on educational aspirations and plans discussed earlier were able to "explain" their context effects by controlling for various other variables. In each of these studies there had initially been a modest context effect. McDill, Rigsby, and Meyers (1969) found that controlling for aggregate parental involvement in school affairs explained their context-plans relationship; Sewell and Armer (1966) found that multiple controls for sex, individual ability, and individual level social status greatly reduced their school context effect; and Campbell and Alexander (1965) found that controlling for the social status of the student's closest friend eliminated their school status-plans relationship.

Critics of contextual analysis have taken such results as demonstrative of the spurious nature of student body composition influences. Hauser (1970) has maintained that contextual influences are merely artifactual consequences of the failure to control adequately for individual level variables. In addition, he asserts (1970: 659) that, "The contextual fallacy occurs when residual differences among a set of social groups, which remain after the effect of one or more individual attributes has been partialled out, are interpreted in terms of social-psychological mechanisms correlated with group levels of one of the variables." Presumably this implies both measurement at the wrong level of analysis and interpretations which jump levels. His general conclusion is that greater attention should be devoted to the construction and measurement of individual level models, since so often the interpretation of contextual effects involves untested individual level propositions.

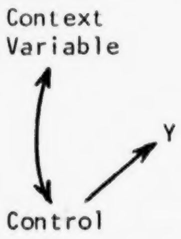
Various investigators of contextual influences in school settings have responded to criticisms such as these, and particularly to the negative results presented by Sewell and Armer (1966). The gist of their replies to Sewell and Armer (Turner, 1966; Michael, 1966; Boyle, 1966), beyond their common criticism of inadequate data analysis and interpretation, seems to involve two related points: the indiscriminate use of multiple controls on individual level variables in examining contextual effects is atheoretical; and, if the causal implications of certain combinations of controls were made explicit, they would indicate theoretically tenuous models. These points merit brief elaboration.

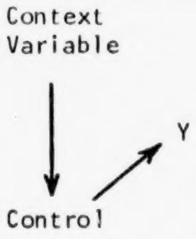
In controlling for individual level variables in simple correlational analysis one is tacitly assigning all of the joint influence of the control and contextual variables to the control variable. The elimination of contextual effects under such control strategies is often assumed to imply a causal model in which the control variable is causally antecedent. However, it should be noted that the elimination of an apparent contextual effect through such partialling does not by itself resolve the question of which of the variables is to be accorded causal priority. For example, it could conceivably be argued that climate affects ability or, similarly, that through some rather elaborate selection process, climate affects individual status characteristics (for example, by prompting individuals to move to a certain neighborhood because of the "attractiveness" of its social climate). The indiscriminate use of multiple control strategies resolves these theoretical issues by default.

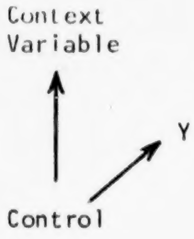
Gordon's comments (1968: 592-593) regarding the potential abuses of atheoretical partialling and the necessity for adequately specified causal assumptions in multivariate analyses are applicable to this discussion:

> The introduction of a control variable into a relationship always implies a theoretical context, although in practice the context is often left unspecified . . . . Some researchers, however, engage in what is actually atheoretical partialling, as though the only hypothesis being tested were the purely statistical one of whether the zero order relationship could survive the application of any conceivable control.
>
> The object, of course, is not simply to destroy an observed relationship but, rather, to see whether it can be destroyed by controlling for a variable that has been hypothesized to be potentially relevant and conceptually distinct within the theoretical context within which one has chosen to operate.

The elimination of contextual effects when controlling for individual level variables could imply any of the following three simple causal models, as well as innumerable more complex ones:







Only the last case demonstrates that the contextual variable does not have causal relevance for the dependent variable. Of course, these points apply to all multivariate analyses and do not take into consideration the unique problems in adequately specifying models that include both individual and aggregate level variables. The critic of contextual analyses would simply contend that models of the first two types only occur because of measurement error and uncontrolled individual level variation. The same arguments, of course, would similarly apply to contextual effects which withstand the application of various individual level controls. It is evident that these are "open-ended" criticisms which can never be adequately empirically resolved given the limitations of our typical research designs. Even the most robust of contextual effects, having necessarily withstood only some finite number of individual level control variables, is subject to the same attacks.

It now becomes obvious that the controversy over specific control strategies in particular studies necessarily implies more fundamental questions regarding the efficacy of contextual analysis itself and the standards of proof appropriate to the evaluation of such research. These more fundamental issues are articulated in Hauser's contention (1970) that: individual level variables actually explain all contextual effects; and, since interpretations in contextual analyses usually imply individual level propositions, analyses should be formulated at the individual level in the first place. The first point seems to involve personal preference rather than theoretical precept. A structuralist or "contextualist" could simply assert the opposite. Regarding the crossing of levels of analysis, we would suggest distinguishing between crossing them causally and doing so interpretively. Rejecting the former posits that structure or context cannot affect behavior. This, of course, is the basic issue in this controversy, and we shall return to it shortly.

Rejecting interpretive crossing of levels is more defendable; however, we would urge caution in rejecting any endeavor out of hand. If, indeed, structural or compositional measures are employed as surrogates for individual level variables or are thought to, in some way, summarize complex chains of individual level cause-event sequences, then efforts should certainly be made to devise measures at a level of analysis appropriate to their interpretation. Having conceded this, though, we would argue that in the absence of such measures it is legitimate to employ aggregate variables as surrogates for individual level measures (particularly if the alternative is to dismiss theoretically relevant issues from the realm of empirical analysis), but to do so cautiously. (A number of the articles in Dogan and Rokkan's *Quantitative Ecological Analysis in the Social Sciences* touch on this point. See, in particular, Allardt's "Aggregate Analysis: The Problem of Its Informative Value.") The conclusions derived from such analyses should be considered quite tentative and employed as sources of "reasonable hypotheses" which await confirmation through more rigorous research designs. Of course, this application of aggregate measures is merely a hueristic device and should be treated as such. With such usage, no pretensions to having established aggregate effects *sui generis* should be forthcoming.

It should be recognized, however, that most of the variables employed in traditional sociological research are aggregated at one level or another. Socioeconomic status is a clear example of this. Often SES is theoretically important because it is thought to encompass a multitude of individual behavioral exchanges which, in the aggregate, affect some dependent variable. This is certainly the sense in which the variable is employed in most of the socialization literature; yet it seems that we are not unduly wary in employing these aggregated surrogates. These comments are equally applicable to individual status background indicators (i.e., parental levels of education, etc.) as to composite SES indices, which have recently come under criticism (Hodge, 1970).

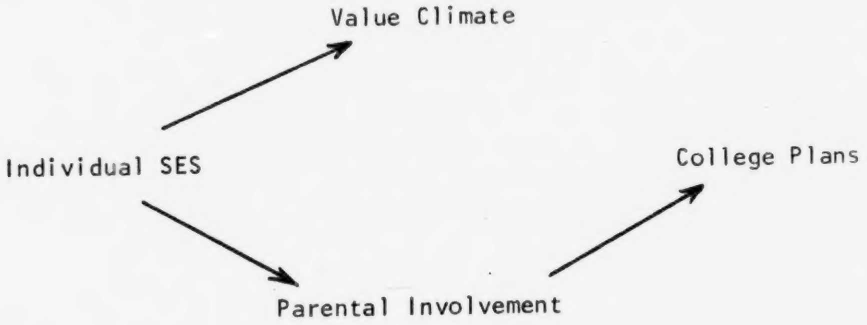
The fact of aggregation per se does not impune the causal relevance of a variable. Rather, the crucial question in making such a determination is whether or not the manipulation of these variables would produce changes in the dependent variable(s) of interest.

To date, our operationalizations of contextual variables have been relatively crude. The simple averaging of aptitude scores in creating a contextual measure assumes that each unit or aggregation (i.e., each individual aptitude score) contributes a constant equal weight to the composite with regard to all dependent variables. Recent advances in the methodology of index construction, such as the use of factor analysis, canonical correlation analysis, and path analysis, to derive empirical weighting schemes in the construction of composite indices (see discussion in Chapters 4 and 5) have not yet been widely applied to the construction of composite, aggregate contextual variables. But crudity of measurement does not necessarily imply conceptual or causal irrelevance.

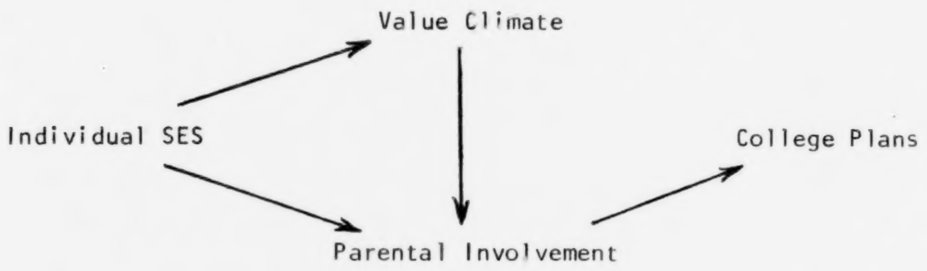
Rather than discontinue the use of such measures, we should employ them cautiously, recognize their limitations, and continually seek improved measurement strategies.

The most frequently articulated criticism of contextual analysis is the aforementioned charge that uncontrolled individual level variation actually accounts for compositional effects. This, as already indicated, is a most difficult charge to cope with, for, despite the elegance of the control procedures employed, the critic can always enumerate additional individual level variables whose effects might still be confounded with that of the aggregate variable. Furthermore, the implications of various control strategies are themselves subject to varying interpretations. For example, the statistical controls employed in the McDill, Rigsby, and Meyers (1969) and Campbell and Alexander (1965) research which eliminate contextual relationships might be taken as either demonstrations of the artifactuality of such relationships or as indicative of a causal model in which the contextual variables are causally antecedent (Michael, 1966: 703) or intervening.

McDill and his associates found that parental involvement explained their value context-college plans relationship. One interpretation of these results would involve shifting levels of analysis in assuming that school context measures merely reflect the fact that high SES schools have mostly high SES parents, who tend to be more active in school affairs. Since parental involvement is the "true" cause of high educational goals, the contextual effect is a spurious artifact of the individual SES effect on both parental involvement and school SES. The model might look as follows:



An alternative model, though, might assume that value climate has an independent effect on parental involvement (for example, through the activities of a more aggressive PTA or a wide variety of school functions that attract community involvement). In this case we might have the following model:



Controlling for parental involvement in this model would also reduce the context-plans relationship, much as in the first model, but in this case the original relationship is not spurious. Rather, value climate serves to mediate some of the influence of individual status on parental involvement. It might be noted, though, that McDill, Rigsby, and Meyers (1969) examined aggregate parental involvement and did not shift to the individual level in the interpretation of their results.

Campbell and Alexander (1965) are somewhat more explicit in proposing a rather straightforward, but insightful, causal model to explain structural effects. They assume that the proportion of high status students in a school will affect the probability that any particular student will have high SES close friends. Peer influences, in turn, will affect levels of aspirations. Their model would involve a simple two-step chain:

School SES Context.........➤ Friend's SES........➤ Academic Plans

Once again, controlling for the intervening variable would eliminate the contextual effect, but that effect is not spurious. As Campbell and Alexander (1965: 284) state:

> The value system and normative milieus of the larger social structure typically influence the behaviors of individuals through transmission and enforcement by certain specific others for any given individual . . . . In short, it is necessary to consider the position of the individual within the social structure--defined in terms of his specific

relations to other members of the collectivity--before attributing causal relevance to the characteristics of the total collectivity.

The formulation of their own model, however, indicates "causal relevance" for the collectivity, in that it influences the probability of having high status friends. It should be noted that we have not "social-psychologized" the impact of the structural variable. We have assumed its significance at the aggregate level and find no need to resort io implicit individual level propositions in interpreting its effects.

Thus, we would argue that contextual variables can be employed at the aggregate level without reductionist interpretations and can be incorporated into causal models with individual level variables. Although Hauser's criticisms are useful in sensitizing one to some of the potential pitfalls of contextual analysis and appropriately compel one to make explicit the assumptions underlying his analysis, his outright rejection of such inquiries as not being of any utility appears to overstate the case.

It seems entirely reasonable to us to postulate that the interaction context in educational settings should have implications for a variety of individual level outcomes. The abstract wording of "contextual" or "compositional" effects might distract us from the basic issue involved: do various aggregate characteristics of a student body have causal relevance for an individual's subjective adaptations and eventual attainments?

Expressed somewhat differently, can we expect any particular consequences to follow from transferring an individual from, for example, a low SES school to a high SES one, or from a low aptitude environment to a high aptitude environment? At the very least, student body composition would seem to set the interaction context within which an individual student must function and develop self-conceptions of his own competence. Thus, aggregate characteristics would appear to have causal relevance in determining the likelihood of acquiring friends with particular traits and in establishing a frame of reference for the operation of various social comparison processes.

As will be more fully developed in our contextual model, compositional variables, context "givens" if you will, are important primarily as antecedent variables which affect the nature of, and outcomes in, more interpersonal exchanges and comparisons. As is evident in Campbell and Alexander's two stage model, such composition characteristics should have predictable, if indirect, implications for a variety of within school outcomes. Beyond the linear, additive effects implied in such a model, we might also speculate (but not examine in this project) that additional aggregate variables, such as density of interaction within a particular educational setting, might similarly affect various educational outcomes. Such conceptualization of contextual effects avoids their reification by specifying the interpersonal and social comparison processes by which aggregate student body characteristics actually affect the dependent variables of interest.

It should not be ignored in this discussion that while various individual traits, such as academic aptitude and status background, are not readily manipulable by either the social scientist or the social planner, such characteristics in the aggregate are considerably more amenable to such intervention and control. If the nature of a youth's intimate associates or the quality of his academic competition are relevant to the within school attainment process, these should be affected by the aggregate characteristics of the student body population with which the youth must interact. If changes in these aggregate characteristics necessarily affect the more interpersonal processes as we postulate they should, it seems entirely appropriate to consider these at least partially the indirect effects of the various student body composition characteristics of importance.

Beyond this conceptualization of contextual effects, which reinforces rather than denies the importance of individual level variables in the attainment process, there is a growing body of contextual effect literature documenting "relative deprivation" processes which would seem to be quite difficult to explain away under the "uncontrolled individual level variation" hypothesis.

All of the examples of contextual analyses discussed by Hauser (1970: 646) as being explicable through this alternative explanation involved the positive effect hypothesis that the higher the social status characteristics of the student body, the higher the individual's educational aspirations or expectations, or the better his academic performance. Since in these instances various individual level traits, such as status background and academic ability, would be similarly positively related to the dependent variables of interest, the "uncontrolled variation" alternative hypothesis is viable.

The relative deprivation model, on the other hand, posits a negative contextual effect, with student body aptitude composition functioning to depress such things as educational expectations and academic self-conceptions through lowering relative performance scores (Davis, 1966; Werts and Watley, 1969; Drew and Astin, 1972; Meyer, 1970). Since the individual level traits most commonly assumed to explain contextual effects would be positively related to these dependent variables, the prediction of a negative contextual influence would seem to constitute a powerful test of the contextual effect hypothesis. With the contextual proposition anticipating a negative effect, and most competing explanations positing positive consequences for a given dependent variable, we approximate what has been designated a "crucial experiment" (Stinchcombe, 1968). The empirical demonstration of such a negative effect calls into question the merit of the "uncontrolled individual level variation" hypothesis as a general explanation for contextual effects. We will develop this relative deprivation model more fully in the next section of this chapter. It is felt that the negative effect relative deprivation hypothesis and the contextual effect mediation model, which specifies the interpersonal processes through which contextual variables actually affect subsequent outcomes, constitute powerful arguments for the retention of contextual analysis as a legitimate area of inquiry. The former permits us to cope with some of the more commonly articulated "alternative explanations" of contextual effects, while the latter develops a meaningful process model to explain the actual dynamics of contextual effects within educational settings.

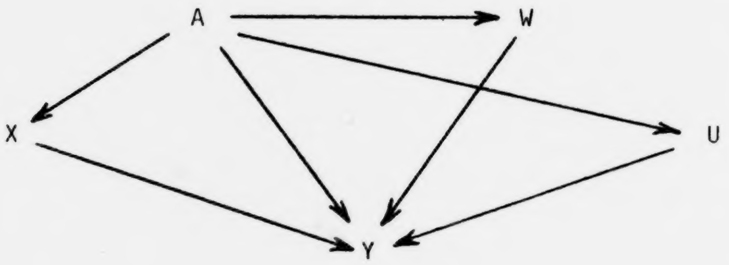
Our comments to this point are not meant to imply any sanguinity regarding the limitations and interpretive problems in contextual analysis. Rather, we prefer to deal with these issues as specific problems of measurement and theory construction, similar to those encountered in the operationalization of any substantive model.

Hauser's cavalier rejection of the underlying contextual model masks the fact that similar problems can be encountered in any analysis. For example, what model or research design in any substantive area would enable us to unequivocally reject all possible alternative plausible hypotheses? None, of course. Yet this appears to be the standard against which Hauser is evaluating contextual analysis designs. Given the limited application of classical experimental procedures to many of our substantive interests, which would by no means be a panacea for all our problems (Campbell and Stanley, 1963), we are forced to proceed by a method of successive approximation, rejecting as many plausible alternative hypotheses as our admittedly limited techniques allow (Stinchcombe, 1968: 15-28). A critic can always argue for the centrality of some omitted variable, thereby calling into question the validity of an analysis, but it would seem incumbent on the responsible critic to be specific with his charges of omission in each analysis. Only in this way is the charge at least potentially resolvable, through the measurement of the presumed "culprit" and its inclusion in either subsequent or reanalyses.

Hauser began his critique (1970: 69) of contextual analysis by appropriately identifying the real issue, the problems encountered in aggregating data: "The analysis (of the Consexual variable) was generated only to illustrate an error which is commonly made in shifting from individual to aggregate units of analysis." Having appropriately identified the problem, he then shifts to an argument based on a strained "logic of proof" model and that amounts to theoretical dogmatism.

This is unfortunate, since a lucid, cogent assessment of the implications of aggregation for contextual analysis could serve a quite useful purpose. As Werts and Linn (1971: 415) and Hauser (1969: 605) note, compositional or contextual variables are elements of the residual between-group effects in the analysis of covariance model. In the decomposition of this residual, it is quite likely that covarying individual level attributes will explain a good deal of the between-groups effect, just as Hauser assumes. But it is an empirical question as to whether such factors can account for all of this effect, and any decision on this matter must await the development of analytical models that successfully decompose the between-groups explained variance.

The fact that our contextual variables potentially covary with all other between-school differences in our analysis, as in the examples developed by Blalock (1964: 131-143) and Hannan (1971: 492-493), is indeed problematic. In the extreme case, the aggregation variable might be related to all other variables in the model, including other aggregate variables, as follows (Hannan, 1971: 493):



Where: A is the aggregation variable, in our case individual schools;

X is the contextual variable;

W and U are other independent variables in the system;

Y is the dependent variable.

In this model, the aggregation variable exerts an independent influence on all other variables in the model, potentially inflating our estimation of b_{xy} by confounding the effects of all independent variables in the system. If there were no "true" influence of X on Y, but all other influences were operative as shown and unmeasured, our analysis would demonstrate a spurious contextual effect.

Placing the problem of aggregation in contextual analysis in this framework provides a more accurate appraisal of the practical measurement problems involved and suggests appropriate coping strategies. Not surprisingly, the adequacy of the underlying model is of crucial importance. Thus, as has already been emphasized, the demonstration of contextual effects, sui generis, requires their incorporation in adequately specified causal models which allow for the control of other theoretically relevant variables, both individual and structural, in some hypothesized sequence of cause and effect. This will be our strategy, and, practically, it is the only appropriate strategy for assessing any causal model, regardless of the level or levels at which it is formulated.

Proposed Model

Having reviewed some of the literature and issues involved in contextual analysis, we can now examine some of the overlapping insights from various studies which raise theoretical questions that are currently unresolved. Davis' relative deprivation thesis in his "The Campus as a Frog Pond" (1966) has, in contrast to most of the research we have discussed, explored some of the potentially negative consequences of academic contexts.[3] Developing a social comparison model, he finds a negative relationship between school quality and "high performance career choice" when freshman preferences and aptitude, but not grade point average, are controlled. He offers the following explanation for these results (our summary):

> Within schools, school quality and GPA are unrelated (since school quality is a constant); across schools, however, there is an inverse relationship between school quality and GPA when individual aptitude is controlled. In effect, the better the school attended, the lower the GPA, other things being equal. Since, empirically, GPA is more strongly related to occupational aspirations than is school quality, the negative effects of attending a high quality school (through lowering GPA) will more than offset any positive effects of school quality itself.

Essentially similar results were obtained by Werts and Watley (1969) when they compared the predictions from a relative deprivation hypothesis with those derived from Astin's "environmental press theory." The latter posits that highly selective environments should motivate students to higher aspirations.

These are interesting empirical confirmations of social comparison processes in the educational system that have been speculated about for some time. Wolfle, in 1954 (p. 151), observed:

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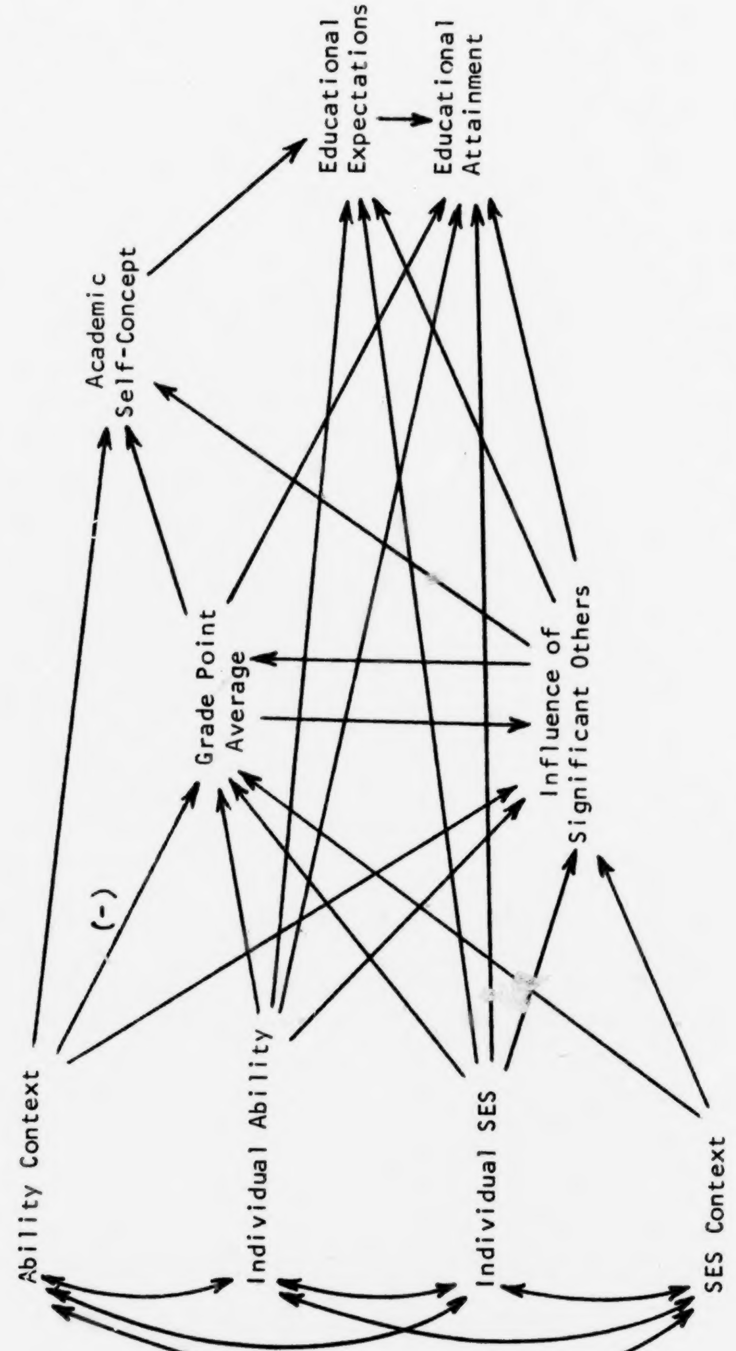
[3] Most of the achievement research in the Coleman and USCCR reports indicates no detrimental effects of racial or social class integration for white or upper status students.

> When a high school student tries to size up his prospects for successful college work, school grades are an obvious guide for him to use. Ginzberg and his associates found that an adolescent characteristically goes through a stage of appraising his potential success in a field which he is considering by thinking in terms of the caliber of work he has done in relevant school courses. He is usually vague about his own score on a standardized intelligence test. But he does know his class standing, and it is likely to be the most important single variable in helping him to decide about his chances of doing successful college work.

Indeed, there is reason to assume that similar processes are operative in evaluating the probability of success in graduate school. As Davis notes (1964: 76), the decision not to apply to graduate school is a greater screening device than is the rejection of applications for either admission or stipends. In the NORC study, 84 percent of those applying to graduate school (which was defined so as to include most forms of post-baccalauriate training) were admitted, and a majority of those applying for stipends received some financial aid. Since the Werts and Watley (1969) and Davis (1966) analyses pertain to college-level comparison processes while Wolfle's (1954) is directed to within-high school relative performance evaluations, it is likely that such processes are operative at all educational levels.

We have already noted a seeming contradiction in the Coleman Report data (assuming their validity): Higher status contexts lower the academic self-concept of "deprived" students but have salutary effects on their academic performance. Perhaps Davis' analysis can suggest an explanation for these results (1966).

Davis documents the negative consequences of school quality or selectivity on aspirations, presumably operating through depressing one's grade point average. The Coleman Report employs a social status, rather than ability, context measure, but it can be safely assumed that the two are highly related. Thus, select school ability contexts seem to depress aspirations, controlling for individual aptitude; while high status contexts seem to depress academic self-concept but raise performance. Since we can analytically separate ability and status contexts (and hopefully we can do so empirically also), these data suggest a causal model that might provide a more comprehensive picture of the dynamics of contextual effects:


Ability Context
Individual Ability
Individual SES
SES Context
(-)
Grade Point Average
Influence of Significant Others
Academic Self-Concept
Educational Expectations
Educational Attainment

The large number of hypothesized effects in this model might conceal some of the significant points we wish to make. In it, we include the role of some of the interpersonal-subjective factors discussed earlier as mediators of the effects of the more "objective" background and ability variables. Since the rationale for their presumed role has already been discussed in some detail in our literature review of general attainment processes, we will not bother with further elaboration at this point. We will only note that we do anticipate modest direct background-ability influences on ultimate educational attainments even with our educational expectations item included in the model. Nevertheless, most such effects should be mediated through the various within-school subjective and interpersonal variables in the analysis.

We are hypothesizing that the negative effects on academic self-concept found in the Coleman data are a consequence of the ability milieu's depressant effect on performance relative to others' (while absolute levels of performance might well be raised). Since ability and status are so highly correlated, it would be easy to confound their effects in the absence of specific controls for one while examining the influence of the other. Social status context, on the other hand, should promote high aspirations and performance through the mediating influence of significant others. Controlling for the negative effect of school ability contexts on GPA, the more select the ability context, the higher aspirations and academic self-concepts should be; however, we should expect these effects to be smaller than those mediated through relative performance scores (hence, the net effect of selectivity should be negative).

Meyer's data (1970) offer some support for these speculations. He found that controlling for average school ability raises the positive relationship between average school status and college plans, and that the higher the average ability of peers, the lower was the student's academic self-confidence. Thus, he concluded that high status contexts foster college aspirations, but also doubts about one's ability, thereby reducing the context's positive influence on aspirations. This is quite consistent with our model, but his analysis and conceptualization were far less involved than that which is proposed in our model.

Meyer's analysis employs the seniors from the original 1955 sample from which the fifteen-year follow-up sample for the EEO Survey was drawn. His preliminary analysis offers some encouragement as to the feasibility of separating ability and status context effects for our more detailed examination of these processes. He found a zero order correlation of .69 between his ability and status context measures, presumably low enough to separate them for analytical purposes (1970: 63).

We are advancing a two-step model to explain ability contextual effects that is similar to Campbell and Alexander's (1965) model for status context effects. As mentioned previously, they argue that the effects of social structure are mediated through various interpersonal influences. In their example, the proportion of high status students in a school influences the likelihood that any particular student will have high status friends. In a similar fashion, the effects of school selectivity, or average student ability, are mediated through its effects on relative performance measures (GPA or class standing), thereby establishing a standard of evaluation which influences self-concept and levels of aspiration. In both cases, we would expect the direct effects of such contextual variables on later outcomes to be minimal.

High status school contexts should not influence grades directly once ability is controlled. It will, however, have an indirect effect on academic performance by providing academically oriented role models. This, of course, is the thesis developed by Campbell and Alexander (1965) regarding college aspirations. Indirect support for these expectations is obtained from studies that demonstrate that peer-parental consensus on educational goals almost eliminates differences in levels of aspiration between social classes (Kandel and Lesser, 1969; Simpson, 1962). Since our measures of peer normative influences on goal-setting are imperfect, we shall expect a modest direct status context effect even with friends' status controlled.

As can be seen from our model, we expect level of aspirations, GPA, influence of significant others, and individual ability all to have effects on ultimate educational attainments. We anticipate that most of the effects of ability and others' influence will be indirect, being mediated through their impact on GPA and aspirations.

We will examine these contextual effects at both the high school and collegiate levels. While Davis (1966), Werts and Watley (1969), and Drew and Astin (1972) have documented such college-level student body composition influences, Meyer (1970) and Nelson (1972), among others, have examined similar processes at the high school level. Our analysis of contextual effects in both educational settings on the same sample of respondents will allow us to assess the generality of these phenomena. At the college level we lack data on levels of aspirations, peer influence, and SES context. Although we have no substitutes for the context and peer items, previous research indicates that status effects are less enduring than those for ability during the college years.

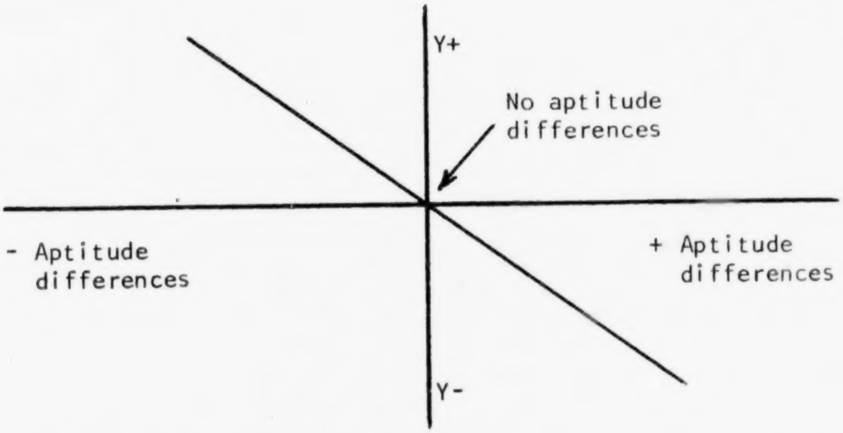
In addition to these separate analyses of contextual effects at different educational levels, we would like to examine the consequences of changing contexts. To our knowledge, this topic has not yet received attention in the literature. Employing Davis' terminology, we might examine the consequences of changing from being a Big Frog in a little pond to being a Little Frog in a big pond, and vice versa. Thus, the transition between ability contexts may have a unique effect on academic performance and, consequently, self-evaluation, over-and-above the main effects of such composition variables. We shall also examine any such consequences for levels of educational attainment and job status. As we have already indicated, we expect individual level variables to have the greatest explanatory power in these models, with contextual variables having mostly modest and indirect effects. Hence, we do not expect these interaction effects to be of dramatic magnitude. Nevertheless, they are of theoretical interest and merit attention.

Our hypotheses regarding the consequences of context-individual attribute interactions may be stated as follows: at a given level of personal ability, the transition from an educational context with a lower aptitude student body to a higher aptitude one should lower relative performance and, consequently, lower aspirations; conversely, the shift from high to lower ability contexts should improve GPA, raise aspirations, and perhaps raise attainments. These effects should be minimal when high school and college contexts are roughly comparable in average student ability.

It will be noted that the expectations actually imply a linear effect hypothesis. This hypothesis may be presented categorically in the following two-by-two table, in which our expectations of effect fall in one diagonal:

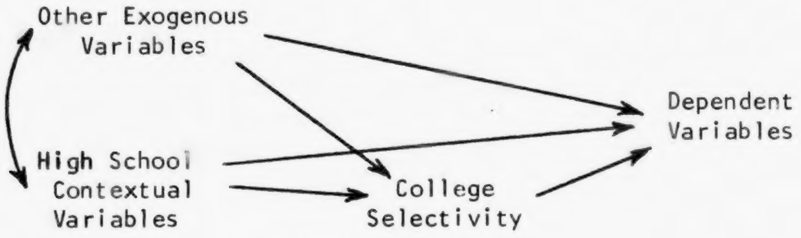
		College $\bar{X}$ Aptitude Level	
		Low	High
H. S. $\bar{X}$ Aptitude Level	LOW	No Change	Negative Consequences for D.V.'s
	HIGH	Positive Consequences for D.V.'s	No Change

If we were to take the difference between average aptitude levels, these hypotheses could be succinctly restated as follows: the greater the positive difference in aptitude scores, the more negative the consequences; the greater the negative differences in aptitude scores, the more positive the consequences. Since the difference scores can assume either positive or negative values, the combination of the two propositions into a single one is awkward, but clearly they do combine to posit an inverse linear relationship. The following graph portrays this inversion:



Thus, the greater the negative difference, the greater the y scores; the greater the positive differences, the lower the y scores. As Blalock has demonstrated (1967), however, a model which hypothesizes both main effects and a difference effect on a given dependent variable is underidentified. Since the difference equation is an exact function of the two main effect equations, we have three unknowns to estimate from only two distinct simultaneous equations. Under such circumstances, we cannot obtain unique estimates for the three parameters in the model.

Since all three parameters cannot be estimated, it is necessary that one be dropped from the model. In so doing, the omitted effect is subsumed under the remaining effects so that no explanatory power is lost. For example, if we were to include the aptitude difference score and a measure of average college aptitude level in the college analysis, the difference effect would actually include both high school aptitude main effects and difference effects. Given that it is impossible to estimate all three parameters simultaneously and that our difference hypothesis is actually a linear hypothesis, we will employ a linear transition model of contextual main effects which subsumes the difference effects. Thus, our analysis of the context transition problem will involve a straightforward elaboration of the models already developed through the inclusion of high school contextual variables as exogenous variables in the collegiate path analyses. Thus, the transition model will be as follows:


Other Exogenous Variables
High School Contextual Variables
College Selectivity
Dependent Variables

College selectivity will now be examined as a dependent variable in the college level analysis, with the effects of high school contextual variables on it and on other dependent variables evaluated.

CHAPTER 3

SURVEY DESIGN

The primary EEO sample contains usable records for 2,077 students who were enrolled as sophomores in 1955 in 42 public schools across the nation, tested by the Educational Testing Service (ETS) in 1959, followed up by ETS in 1959, and later followed up by the Institute for Research in Social Science (IRSS) in 1970. (Similar data were obtained by IRSS for 385 seniors who were enrolled in the Southern institutions in this sample in 1955.) The sophomore sample approximates a representative national sample of its age cohort, with the following exceptions:

(a) Students attending predominantly non-white institutions were excluded;

(b) Private schools were excluded;

(c) Large-city schools tend to be underrepresented; and

(d) Low-ability students and school dropouts tend to be underrepresented.

These and a number of minor restrictions are the result of both sampling design and response bias. Some of these restrictions warrant special attention and will be dealt with in this chapter. We begin with a historical sketch of the project and a description of our field operations.

The Original 1955 ETS Survey

In Spring 1955, the Educational Testing Service conducted a survey in the nation's public schools called "A National Study of High School Students and Their Plans." Sponsored by the National Science Foundation, its main purpose was to assess certain aspects of the American educational system related to the encouragement and development of human resources in the sciences. Aptitude tests and questionnaires (emphasizing college plans) were administered to a national representative sample of two cohorts of public school students, comprising all the seniors in 516 schools and the sophomores in 97 schools. The latter represented roughly 1 per cent of the public high schools contained in the U.S. Office of Education's 1951-52 Biennial Survey.

Since selecting a simple random sample of all students was deemed impractical, ETS used a cluster sampling approach, the clusters being school units. After listing the schools from the Biennial Survey in descending order by size within each of four census regions, from a random start, every twentieth school in each region was chosen and invited to participate in the ETS survey. Of the 804 schools (called the "designated sample") that were selected in this manner, 516, or 64 per cent, cooperated (called the "analyzed sample").

All of the seniors present in these schools on a specified day in January or February (1955) were given the ability test and questionnaire. (Both were designed to be completed during one 40-minute class period.) A total of 35,472 usable records was obtained. The estimated loss due to absences or other factors inhibiting student participation in these schools was less than 5 per cent.

Bias factors due to school noncooperation were investigated by direct comparisons of observed differences between the designated and analyzed schools (from published data) and by a special follow-up of a subsample of 38 of the nonresponding schools. The most serious bias resulted in an underrepresentation of smaller schools, particularly in the North Central and Southern regions. There was an average of 27 twelfth graders in the nonparticipating schools as compared with an average of 68 twelfth graders in the participating schools. Thus, although only 64 per cent of the designated schools were represented, 85 to 90 per cent of the students in the cohort were in fact represented in the analyzed sample. Other biases introduced at this stage were relatively minor. The students in the participating schools scored somewhat higher on the academic aptitude test and the proportion from professional and business-supervisory homes was slightly larger than in the designated sample.

For the sophomore sample, every fifth school (160 of the 804 originally designated) was selected. Of these, 97 administered the aptitude test and the questionnaire to all tenth graders present on a specified date in March 1955. Completed records were collected from a total of 9,699 students. The resulting figures represent 61 per cent of the schools enrolling at least 80 per cent of the pupils in the designated sophomore sample.

The items used in the ability test for this survey were chosen by ETS to yield maximum discrimination in the region of the 70th percentile in the twelfth-grade population, and to allow most students to finish the test within 15 minutes (although it was administered under untimed conditions). The particular combination of test material used (12 vocabulary and 8 arithmetic computation items) is one known to be highly predictive of success in college. Based on a 500-case sample drawn from the senior survey data, the reliability of the test, computed by correcting the coefficient of correlation between scores on odd and even numbered items, was .82. The test had a mean of 8.8 and a standard deviation of 4.6.

The test was somewhat more difficult for the tenth-grade population, resulting in a distribution skewed toward the lower regions. For the sophomore sample, the mean was 6.6 and the standard deviation 4.0. The effect of any misclassification due to the only moderate reliability of the test is to minimize the observed correlations of factors associated with aptitude. The effect of skewness is to place most classification errors in the middle to lower regions, i.e., between the average and low-scoring students.

The data from the original senior survey were reported in two ETS monographs (Stice, 1956 and ETS, 1957), and have been used profitably by a number of other investigators (Cole, 1956; Michael, 1961; Orcutt, 1961; Meyer, 1970; and Ramsøy, 1961, 1963, 1965a and 1965b). The sophomore data had never been released by ETS and led only to the one report noted below.

The 1959 ETS Follow-Up Study

In January 1959, ETS asked the principal of each of the 97 schools in the sophomore sample to supply information about the former tenth-graders. A follow-up questionnaire was designed to determine if the pupils had finished high school and what they had done since leaving school. Definite outcomes on the first question were ascertained for 9,407 (97 per cent) of these students (Stice and Ekstrom, 1964). In contrast with the biases involved in obtaining the original sample, the possible biases introduced by a systematic loss of cases at this point no doubt are negligible.

The 1966 UNC Pilot Study

Seven years later, with the cooperation of ETS, approval of NSF, and aided by a small University Research Grant at the University of North Carolina, the principal investigator of this report conducted a pilot study early in the year (1966) to determine the feasibility of contacting the students directly (rather than contacting only the schools) for a national follow-up survey that would trace their academic and vocational careers. Ten high schools, all located in North Carolina and Virginia, were asked to supply whatever addresses (either of parents or students) they had on file for the seniors who had participated in the original ETS survey. All ten schools cooperated, although one not until after we already had analyzed our results.

Of the 352 cases for whom information was requested from the first nine schools, addresses for both parents and students were provided in 100 cases, addresses for parents only were provided in 171 cases, addresses for students only were provided in 67 cases, and no information was provided in only 14 cases. The reliability of these addresses was ascertained by sending a first-class letter to each parent or student for whom an address had been supplied by the school, and then counting the number returned by the post office due to "forwarding address expired," "insufficient address," etc.

Considering the cases for whom at least one address was supplied, 17 per cent were "lost," i.e., either one (in the case of only one address being available) or both letters were returned by the post office. Adding to this the 14 students for whom no information was available, the overall lost case rate was estimated at 20 per cent -- a figure thought to be well within the practical limits of a large follow-up survey, although it was realized that this figure (a) did not include errors made by the post office i.e., failure to return letters when appropriate; (b) applied only to a small sampling of schools in the two Southern states which may have kept, we did not know, better-than-average records on their alumni; and (c) applied only to the seniors and not the sophomores who, owing to attrition between the 10th and 12th grades, would be more difficult to retrieve. Moreover, even tracking down cases for whom addresses were available was expected to be time-consuming and costly since nearly half of these addresses were for parents only. This meant that it would be necessary to either contact the parents first and ask them to supply addresses for their sons and daughters or to rely upon the parents to forward the mail. Name changes by women due to marriage were expected to create additional problems.

The 1970 EEO Survey

In 1966, the author attempted unsuccessfully to procure funds for a national follow-up survey. The plan, at the time, was to try to locate and contact approximately 20,000 seniors from the original study. The proposed costs of such an ambitious project no doubt contributed to the difficulties we encountered.

Three years later, in Spring 1969, funding for the present survey was made available through the NSF Science Development Grant to the University of North Carolina. Once again, ETS and NSF authorization was obtained to use the original data, including the results of the 1959 follow-up.

Since one of the purposes of the NSF Science Development Grant was to conduct a series of regional surveys with application to problems in the South, we were committed to implementing a study that would give serious attention to this region, yet one that would not jeopardize the representative (national) character of the follow-up (despite a substantially lower budget than originally hoped for). Accordingly, the sophomores were selected as the primary target population, plus the seniors from only the South. The sophomores were chosen because (a) due to high school attrition between the tenth and twelfth grades, the sophomores were more representative of their total age cohort than were the seniors, and (b) after an inventory of the 1955 ETS records, the original answer sheets and other records for the sophomores were found to be more complete. The seniors in the South were added in order (a) to increase the number of respondents in this region for a migration study and (b) to estimate the extent to which the sophomores' versus seniors' educational and vocational aspirations in 1955 either were unusually vague or unrealistic. The seniors also will provide an independent sample for checking the reliability and validity of various other measures.

Because of severe budget limitations and because of the uncertainty of being able to retrieve an adequate number of cases, we elected to invest our initial resources in data collection. We chose to collect a large amount of information on a sample large enough to meet the requirements of most parameters in our models but not so large that we could not employ the personal techniques we felt would be required to obtain an adequate response. Quite simply, it appeared that the costs per case of a longitudinal survey could not be easily justified without rather high expectations of results.

Between 1969 and 1971, the project was variously called "Southeastern Regional Survey Number 2" (SERS 11) and "A National Survey of Educational Aspirations and Goal Achievement." In 1972, the project was retitled "Explorations in Equality of Opportunity" (EEO) to more accurately reflect both the breadth of the content and exploratory nature of the analysis upon which we were about to embark.

Selecting the EEO Schools

Prior decisions and field work by ETS had narrowed the number of schools in the sophomore sample to 97, and the number of students to 9,699. from this group, all 19 schools with class sizes below 20 were excluded. These schools were eliminated because (a) the smaller schools originally had been overrepresented; (b) these schools, together, enrolled only 250 sophomores (or 2.5 per cent of the total) and, thus, their loss would be relatively unimportant; (c) many of the smaller schools since 1955 would have undergone consolidation, which would have complicated searching for records; (d) class sizes under 20 would be especially unrealiable when aggregating the data for the purpose of obtaining measures of school or contextual effects: and (e) the field work we planned (paying school principals, hiring local class representatives in each community, etc.) did not justify the costs required to retain them in the sample.

In addition, two schools in the South were dropped that were known to be predominantly Black. These were dropped because (a) the Blacks, we believe, would have required separate analysis; (b) segregation patterns in the early 50's were such that almost all of the Blacks in this sample were enrolled in these two schools; and (c) their inclusion and separate analysis would have produced low N's and ungeneralizable results.

Owing to budget limitations, we still needed to pare down the sample to a more manageable size. Thus, the remaining 76 schools were stratified by region (4 categories) and class size (3 categories), creating the 4 by 3 matrix with 12 cells shown in Table 3.1. Our objectives were to reduce the school sample to a number between 40 and 45, choosing schools within

Table 3.1

The ETS and EEO Sophomore School Sample

	Class Size			
Region**	20-50	51-100	Over 100	Totals
Northeast	4 (2)*	4 (2)	7 (3)	15 (7)
South	12 (6)	8 (5)	6 (4)	26 (15)
Central	8 (4)	10 (6)	6 (4)	24 (14)
West	5 (2)	1 (1)	5 (3)	11 (6)
Totals	29 (14)	23 (14)	24 (14)	76 (42)

* Figures in parentheses indicate the number of schools in the final EEO sample.

** Northeast:

Connecticut
Maine
Massachusetts
New Hampshire
New Jersey
New York
Pennsylvania
Rhode Island
Vermont

South:

Alabama
Arkansas
Delaware
Florida
Georgia
Kentucky
Louisiana
Maryland
Mississippi
North Carolina
Oklahoma
South Carolina
Tennessee
Texas
Virginia
West Virginia

Central:

Illinois
Indiana
Iowa
Kansas
Michigan
Minnesota
Missouri
Nebraska
North Dakota
Ohio
South Dakota
Wisconsin

West:

Arizona
California
Colorado
Idaho
Montana
Nevada
New Mexico
Oregon
Utah
Washington
Wyoming

cells which were not identical in character and to the extent possible, not located in the same state or section of the region. To accomplish these objectives, the 1955 ETS data were used to develop a profile of each school on the following traits: the school attrition rate, the proportion of students scoring in the lower third of ability, the proportion of students not planning to go directly to college after graduating from high school, and the proportion whose fathers did not graduate from high school (see Table 3.2).

Our final selections obviously were arbitrary in some cases and very difficult in others. For example, in the West all 11 schools clustered in 4 states, and most of these were in California. Thus, in the West, we initially had to ignore the profiles and give priority to choosing schools that were not in California (knowing we would eventually obtain an over-representation of California schools anyway).

Forty-three schools initially were selected in this manner. All but 3 agreed to cooperate and eventually provided the information we requested. Two of the 3 noncooperating schools were replaced by alternates in the same region, while no effort was made to replace the third school. The latter at first agreed to cooperate and did supply some of the data, but the information was too incomplete to retain the school in the sample and received too late for us to consider a replacement.

The 42 schools that comprise the final sample are shown in Tables 3.1 and 3.2. Compared with the ETS sample (N=76), small schools and those located in the Northeast tend to be slightly underrepresented. Although the schools were the sampling unit used at every stage in the survey design since 1955, they were not intended to be the primary units of analysis in this research. Therefore, we should give special attention to an examination of the distribution of the students in our sample. This is presented, according to region and class size, in Tables 3.3 and 3.4

When the EEO sample distributions for region are compared with the designated sample from which the sophomore sample was selected by ETS in 1955, the tendency for students in the Northeast to be somewhat underrepresented is quite clear. Table 3.3 shows, however, that this bias was introduced in 1955 when the sophomore schools were originally selected, rather than in the selection of the EEO schools from that sample. On the other hand, when the EEO schools were selected, students from the Central states were overrepresented. The bias became more pronounced later due to differential response rates (see the last column) and was accompanied by an underrepresentation of students from both the South and Northeast. The most any of these distributions differ, however, is the 8 percentage point difference in the Central states between the EEO 1970 respondents and the ETS designated school sample, which is presumed to be fairly accurate representation of the true distribution of public high school students in the U.S. in 1955.

Table 3.2

Profiles of the 42 EEO Schools, Grouped by Region and Class Size.

	Class Size	School I.D.	% H.S. Dropout[1]	% Low Aptitude[2]	% No College Plans[3]	% Fathers Without H.S. Diploma
NORTHEAST						
(Small)	30	01	27 (+)[4]	27	37 (-)	47 (-)
	46	02	13	41	91 (+)	76 (+)
(Medium)	51	04	12	26	75	51
	89	05	15	35	84 (+)	67 (+)
(Large)	346	03	12	22 (-)	53 (-)	32 (-)
	136	07	7 (-)	20 (-)	52 (-)	46 (-)
	148	08	17	32	60 (-)	44 (-)
SOUTH						
(Small)	45	09	31 (+)	60 (+)	87 (+)	56
	45	11	16	29	80	58
	43	12	33 (+)	47 (+)	74	84 (+)
	36	13	28 (+)	50 (+)	78	89 (+)
	32	14	6 (-)	13 (-)	59 (-)	69 (+)
	35	15	6 (-)	51 (+)	71	63
(Medium)	55	16	16	16 (-)	58 (-)	46 (-)
	67	17	8	70 (+)	73	81 (+)
	65	18	27 (+)	32	83 (+)	88 (+)
	57	19	35 (+)	58 (+)	60 (-)	72 (+)
	55	20	11	18 (-)	71	82 (+)
(Large)	159	21	21	47 (+)	66	68 (+)
	162	22	20	28	48 (-)	46 (-)
	115	25	28 (+)	52 (+)	67	66
	151	26	15	29	52 (-)	42 (-)
CENTRAL						
(Small)	26	27	15	33	74	82 (+)
	30	28	23	27	83 (+)	67 (+)
	28	29	18	36	82 (+)	71 (+)
	37	30	5 (-)	43	76	43 (-)

Table 2. (Continued)

Region	Class Size	School I.D.	% H.S. Dropout[1]	% Low Aptitude[2]	% No College Plans[3]	% Fathers Without H.S. Diploma
CENTRAL						
(Medium)	82	31	5 (-)	18 (-)	76	76 (+)
	92	32	19	34	83 (+)	60
	56	33	25	43	86 (+)	52
	73	34	11	36	84 (+)	78 (+)
	78	35	15	20 (-)	75	44 (-)
	71	38	18	21 (-)	80	42 (-)
(Large)	522	36	29 (+)	28	70	48
	115	37	17	31	82 (+)	46 (-)
	128	39	18	25 (-)	66	48
	136	40	4 (-)	18 (-)	82 (+)	46 (-)
WEST						
(Small)	25	41	16	40	72	48
	32	42	16	25 (-)	69	53
(Medium)	65	43	15	25 (-)	70	55
(Large)	152	44	22	44	82 (+)	67 (+)
	125	45	12	39	70	51
	310	46	12	33	71	43 (-)
ALL SCHOOL AVERAGE[5]			17	35	72	57

[1] Dropout rates are based upon information obtained from the school principals in 1959.

[2] "Low aptitude" is defined as the percentage of students scoring in the lower third of ability (as determined by national norms set for this group in 1955).

[3] "No college plans" refers to those students who were not planning to go to college directly (and without working) upon graduation from high school. (Those who planned to go to college but to work too are counted here in the figures for the non-college group.)

[4] The signs in parentheses indicate percentages (and their direction) which differ from the all school average by 10 or more percentage points.

[5] The "all school average" was computed by averaging the percentages for all schools (N=76). This procedure produces somewhat higher average profiles (indicating more disadvantage) on these indices than would be the case if students rather than schools had been used as the base measure.

Table 3.3

Regional Distribution of Students in Various Samples (in percentages).

Region	ETS Designated School Sample (1955)	ETS Sophomore School Sample (1955)	EEO School Sample (1970)	EEO Respondents (1970)
Northeast	25%	21%	20%	20%
South	30	32	27	27
Central	31	30	36	39
West	14	17	17	14
Base N's	266,197	9,699	4,151	2,077

Unfortunately, data on class size for the ETS designated sample are not available with categories comparable to those used in Table 3.4 and would have been inappropriate to use in any case since they would have been based upon the seniors (which due to attrition between the 10th and 12th grades would have shown classes somewhat smaller in size). The comparisons that can be made in Table 3.4 indicate that the students in the EEO school sample tend to be somewhat more concentrated in the middle range (sizes of 51-100) than they are in the ETS sample, with fewer students in the upper range. These differences become more pronounced in the last column due to response bias. It should be pointed out that 60 per cent of the respondents in the final EEO sample nevertheless are from schools with a sophomore class size of over 100.

The composition of the students, as measured by attrition, aptitude, college plans, and father's education, varied widely from one school to another. Only 12 of the 42 schools shown in Table 3.2 had what might be labeled "average" profiles, meaning no more than one plus or minus sign. (These signs identify percentages on any of the above 4 traits that differed from the all school average by 10 or more percentage points.) Of the 30 "deviant" schools, 15 differed from the average by 10 or more percentage points on 2 of the 4 indices, 11 differed on 3 indices, and 4 differed by this amount on all 4 indices.

Table 3.4

Distribution of Students by Class Size (in percentages).

Class Size	ETS Sophomore School Sample (1955)	EEO School Sample (1970)	EEO Respondents (1970)
Under 20	3%	0%	0%
20-50	10	12	14
51-100	16	23	26
Over 100	71	65	60
Base N's	9,699	4,151	2,077

Of course, since the 4 traits measured here would be expected to be moderately intercorrelated, schools that differed markedly on one would also tend to differ on the others. Direct evidence of the intercorrelations, in fact, is found in this table. In 21 of the 30 schools with "deviant"profiles, the signs are all in the same direction. (It also should be emphasized, however, that in 10 schools the signs are in *different* directions which suggests that the intercorrelations among these variables--which will be very important to us later--indeed *are* only moderate and may vary considerably from one community to another.)

One or two other conclusions can be drawn from these data about the composition of the students in these schools. Summaries of the plus and minus signs from Table 3.2 by region and by class size, show some interesting and predictable patterns:

	Number of plus signs	Number of minus signs
Northeast	5	11
South	24	13
Central	13	13
West	2	3

Schools in the South have proportionately far more pluses than minuses, while just the reverse is true in the Northeast. Since pluses indicate higher than average levels of attrition, low aptitude, etc., the data show that students in the South tend to be "disadvantaged," while those in the Northeast tend to be "advantaged." A closer inspection of the signs in Table 3.2, however, reveals that this is not true for "college plans." Schools in the South exhibiting high college-going rates (as measured by sophomore "plans") outnumber those with lower-than-average rates. Thus, the South's "poor" profile here appears not to be the result of student expectations but the result of high attrition rates in high school, low aptitude, and low parental education (all of which poses some interesting questions that will need to be answered later).

Lastly, the figures below indicate a strong correlation between class size and the number of positive versus negative departures from the averages found in Table 3.2. The smaller schools, as a whole, are more "disadvantaged," which, of course, partly reflects the fact that the smaller schools tend to be found in the South. (For a more detailed discussion of interschool differences, see Eckland and MacGillivray, "School Profiles," Working Paper, No. 1, May, 1972.)

Class size:	Number of plus signs	Number of minus signs
20-50	19	9
51-100	16	12
Over 100	9	19

The main impression that we wish to leave with the reader at this point is that the composition of the schools in the EEO sample is, we believe, both well-balanced and diverse, with deviations from the norm appearing largely among those schools where one might expect them.

Obtaining the School Records

From September through November 1969, the principals of the EEO schools were contacted by letter. The purpose of the follow-up survey was explained and the principals were asked if they would be willing to search their files and provide last-known addresses for the students and/or their parents who had participated in the original ETS study. In addition, it was noted that some school record data was being requested (including class ranks), that we would like their help in selecting a field representative to work with us in their community, and that a report, including a profile of their own students, would be sent to them when the results were in. An honorarium plus a $.35 per case fee were offered for their service. Self-addressed postcards were enclosed upon which to reply.

Of the 43 schools initially contacted in this manner, 22 reported affirmatively (and none negatively). After three or four weeks had passed, the remaining 21 schools were contacted by telephone. These calls produced positive results in all but 3 cases. One of the latter initially was positive but later failed to cooperate fully; the other two schools were replaced by alternates from the same region. (Cooperation from the alternates was obtained directly by telephone.)

Within a day or two after receiving an affirmative reply, special forms were prepared for the students and sent to the school for completion (including a mailer and postage for their return). All but one school completed and eventually returned the material, although some required considerable prodding. After a month or more had passed, we had to call about half of the schools by telephone and in 3 cases send a member of our staff to the school in order to obtain the information needed. The length of time that the schools held these materials varied considerably, as noted below:

Less than one month	18 schools
One to two months	11 schools
Two to three months	8 schools
More than three months	5 schools

Letters of acknowledgement were written immediately upon receipt of the forms, and checks for payment were requisitioned. The honorariums (including fees) averaged $75, but varied from $30 to $183 depending upon the size of the class and the success that the school had in completing the forms. (They were not paid for incomplete forms.)

Most schools supplied relatively complete information. An address of some kind (student, parent, or both) was provided for 86 per cent of all sophomores. Their success, however, was not uniform. While about half of the schools managed to produce addresses for over 90 per cent of their students, some schools did very poorly. The three lowest rates were 34, 52, and 62 per cent.

The majority of addresses supplied by the schools were for the parents: 73 per cent, in contrast to 42 per cent for the students. There, of course, was overlap (28 per cent), as indicated in Table 3.5.

Table 3.5

Distribution of Addresses Received from the Schools in the 1966 Pilot and 1970 EEO Studies

Addresses Received	1966 Pilot Study (N = 352)	1970 EEO Survey (N = 4130)
Both student and parents	28.4%	28.4%
Parents only	48.6	44.8
Student only	19.0	13.1
No information	4.0	13.7
	100.0%	100.0%

This table also shows that the distribution of addresses in the EEO survey was remarkably similar to the distribution obtained in the 1966 pilot study. The only notable exception is the lower proportion of cases with "no information" in the pilot study which probably reflects the fact that the EEO survey sought to retrieve the sophomores whereas in the pilot study we were attempting to trace the seniors. (As we note in the next section, although addresses for parents were more numerous, they were less reliable than those supplied for the students.)

The per case cost for these addresses, figuring only the honorariums and fees paid to the schools, was $.88, based on the 3,563 cases for whom addresses were supplied. Considering all cases for whom addresses were requested, i.e., 4,151, the per case cost was $.76.

Screening the Addresses

Beginning in February and continuing through April 1970, first-class letters were sent to the students and parents for whom addresses had been supplied by the schools. The letters to the students were simply introductory. They described the nature of the study and the subject's earlier participation in 1955, and noted that they would be receiving a questionnaire from us in the near future. The parents, on the other hand, were asked to return a self-addressed postcard giving the current address of their son or daughter. (And, if married, we asked for the names of spouses.)

The primary purpose of these letters was to verify the addresses obtained from the schools. Many of the addresses, we suspected, were badly outdated (meaning that forwarding addresses had expired), and we wanted to identify these as early as possible in order to avoid unnecessary postal expenses later when mailing the questionnaire. Moreover, we did not want to rely any more than necessary upon the parents to forward the questionnaires.

Of the 1,714 letters sent to students, 11 percent were returned by the Post Office as unforwardable or otherwise deficient. Of the 3,023 letters sent to parents, 25 per cent were returned by the Post Office. (Of the 2,263 parents who we presume received our letters, 834, or 37 per cent, completed and returned the postcards.)

Taking the overlap into account, we were able to verify at least one address for 81 per cent of the 3,563 sophomores for whom an address of some kind was supplied by the schools. In total (including students for whom no information had been provided), 32 percent of all cases were classified as missing persons--a figure significantly higher than that (20 per cent) obtained in the 1966 pilot study which is mainly due, we suspect, to the fact that the pilot study dealt with the seniors rather than sophomores.

Thus, not counting persons known at this point to be deceased or those whose addresses which still might turn out not to be reliable, the whereabouts of 1,313 students remained undetermined. How many of these cases could eventually be retrieved would depend upon the efforts of our field representatives and the cooperation of the respondents themselves.

The above figure, as noted, represents only those sophomores whose present whereabouts (or their parents' whereabouts) were unknown after all screening letters had been returned (if they were going to be returned). Approximately 360 cases were added to the missing persons list later when it was found that questionnaires were being returned by the Post Office for individuals whose previous letters had not been returned. We estimate that this failure rate for the screening letters, based on the total number of cases eventually returned by the Post Office, was about 22 per cent. We, of course, have no way of knowing to what extent this figure is due to the failure of persons listed at these addresses to return to the Post Office letters not belonging to them or to what extent it is due to idiosyncrasies in the operation of our postal service.

The Field Representatives

When the principals of the schools (or their assistants) were contacted after having agreed to cooperate, they were asked to submit the name(s) of a member of the original class still living in the community who might be willing "to write letters or make phone calls in an effort to locate persons who had left the community." These individuals also would be employed later to help us gain the cooperation of non-respondents.

All of the larger schools and most of the smaller schools nominated one or more candidates for the job. When no nomination was received, we selected a name later from among the early respondents to the EEO questionnaire. Most nominees initially were contacted by letter and asked to return a self-addressed postcard indicating their willingness (or unwillingness) to work for us (or to recommend someone who might). They were offered a payment of $2.00 per hour, plus expenses. This we recognized was a token, as we hoped to rely primarily upon their interest in the survey. (Most, 31 of the 40 active field representatives, were housewives.)

Not including representatives for the senior classes, a total of 80 candidates were contacted for the job. Of these, 53 responded affirmatively, 15 rejected the offer, and 12 did not reply and were not contacted again. (The high rate of response here partly is due to having called a number of the nonrespondents by phone in order to obtain an answer.) Eventually, we were able to gain the cooperation of at least one field representative in each of the 42 communities in which our schools were located. In most of the larger communities with large classes, two and sometimes three field representatives were hired. (And, in some instances, replacements were made when it became evident early enough that someone was not doing his or her job.)

During the months of April through July 1970, each field representative received a packet containing the following material:

(a) A five-page memorandum outlining the procedures for sending us addresses, tips on locating people, and instructions about recording expenses.

(b) A two-page statement entitled "Study Objectives and Progress Report."

(c) An 18-week time table indicating approximately when the questionnaires would be mailed, including the follow-ups.

(d) A form for each missing person upon which they were instructed to record their activities and any new addresses obtained.

(e) Return envelopes and postage.

(f) Expense sheets.

(g) A copy of the EEO survey questionnaire.

(h) A sample copy of the 1955 ETS answer sheet.

(i) A reprint of an article authored by the project director from the Public Opinion Quarterly (Spring, 1968) entitled "Retrieving Mobile Cases in Longitudinal Surveys," which describes and evaluates various procedures for locating missing persons.

Retrieving the Mobile Cases

As already noted, the schools provided the bulk of the addresses initially. These were screened by sending introductory letters to the students and by requests for new addresses from the parents. At this point, a roster of missing persons was prepared for each school. But in addition to sending these rosters to the field representatives, they were sent to the students whose addresses had been verified. That is, a roster accompanied the EEO survey questionnaire and the prospective respondent, in addition to completing the questionnaire, was asked to look over the names on the list and send us (on the back of these forms) any information he had on the whereabouts of these individuals. In this section we will evaluate the effectiveness of both the field representatives' activities and the respondents' cooperation in helping us retrieve the lost cases. As just mentioned, a missing persons list (beginning in April) was included in the first questionnaire mail wave. At the top of the page of each list (which was mimeographed) the following statement appeared:

> Your high school has been able to provide recent addresses for a majority of the members of your class in 1955 (or their parents). However, the following persons have not been located. Do you know their present whereabouts or where they moved after leaving the [name of town] area. If so, please give whatever information you can on the back of this sheet and return it along with your completed questionnaire. The success of our survey depends upon our locating as many of your classmates as possible, and any help you can give would be greatly appreciated.

Periodically, these lists were revised by physically drawing a line through the name of each person for whom a new address had been received. The revised list was reproduced and mailed along with an accompanying note in the first questionnaire follow-up. This note read:

> We greatly appreciate the help that some respondents have given us in providing new addresses for persons (or their parents) listed on the attached roster. Your high school initially supplied us with good addresses for [a number] of your classmates, leaving [a number] persons missing. Over the past month, new addresses have been received for [a number] of the names on the "missing persons list." Would you kindly check over this list and let us know if you know the whereabouts of any of those remaining (or their parents)?

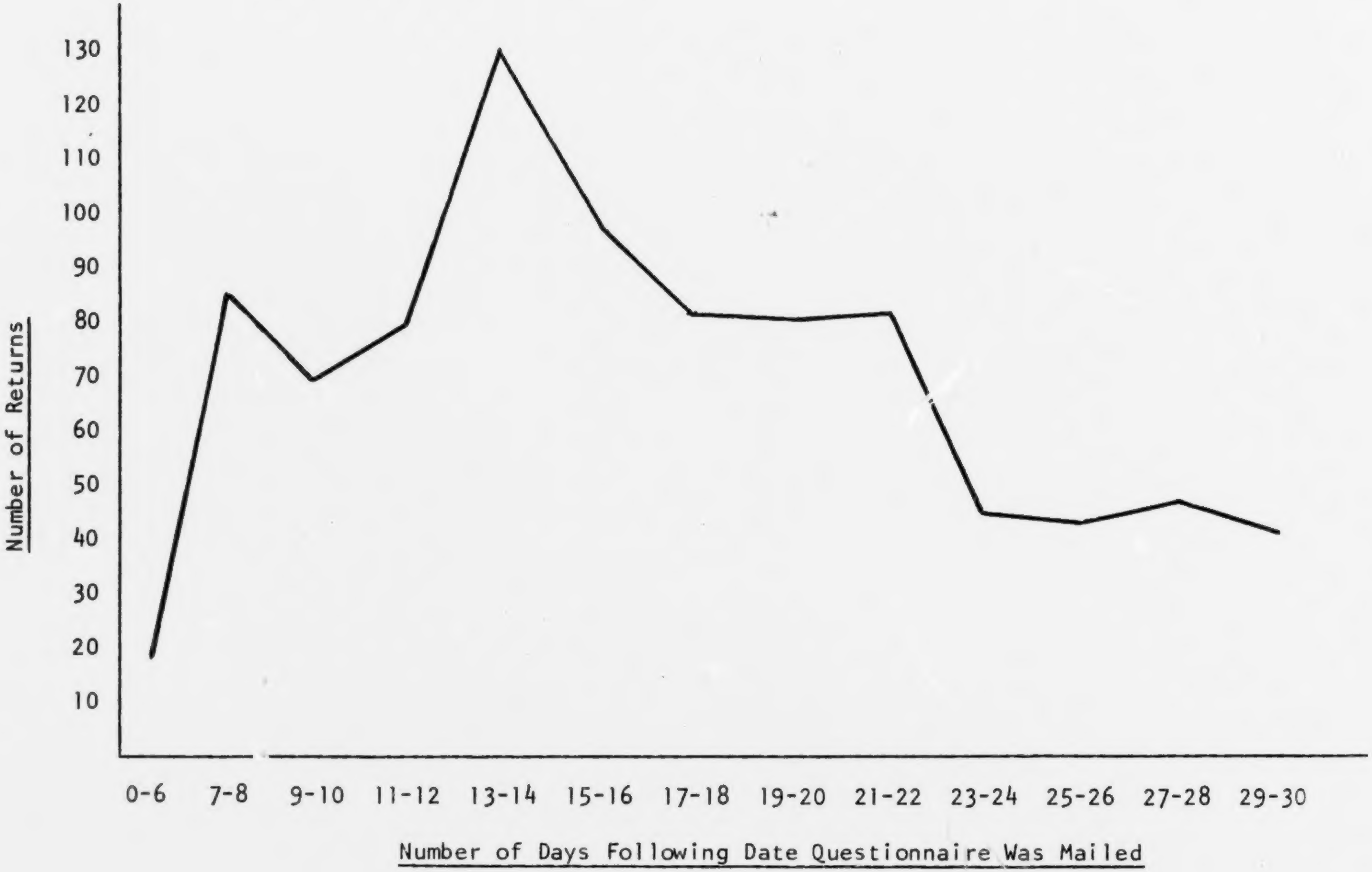
The results of these efforts produced 484 new addresses for missing persons directly from the respondents. This represents 30 per cent of all missing persons for whom new addresses were sought (N=1,590). The field representatives, as a group, were more effective. New addresses were obtained from them for 879 missing persons, which represents 55 per cent of all cases for whom new addresses were sought.

The number of lost cases eventually was reduced to 668, plus 68 persons known to be deceased, or 16 and 2 per cent, respectively, of the 4,151 sophomores in the EEO school sample.

Questionnaire Mailings and Returns

Between Spring and Winter 1970, six mail waves were administered at varying intervals. The initial mailing, as already noted, was simply an introductory letter designed primarily to verify our addresses. The second mailing included the questionnaire (a 36-page, largely precoded schedule containing 159 questions and information on over 2,000 variables), the aforementioned missing persons list, and a photocopy of the original ETS answer sheet completed by each student in 1955. On the back of this photocopy, we instructed each respondent to examine what he had stated in 1955 in regard to his educational and vocational plans after high school. We then asked if these plans had materialized and, if not, what happened.

The purpose of the photocopy was two-fold. In addition to providing potentially useful information, we hoped to personalize the mailing and thereby increase response rates. To document such effects, four "test schools" initially were selected and within each school about one-half of the students were randomly selected to receive the photocopy. Five weeks later we examined the results: 39 per cent of the 189 students who received a photocopy with their questionnaire had responded, whereas only 23 per cent of the 180 students who did not receive a photocopy had responded. We therefore included the photocopy in all first-round mailings of the questionnaire and in a later follow-up to the nonrespondents in the test schools who had not previously received a copy.



BI-DAILY RETURN RATES ILLUSTRATING THE EFFECTS OF THE POSTCARD REMINDER MAILED
EIGHT-TEN DAYS AFTER THE QUESTIONNAIRE

The third mailing was a post card reminder. It automatically followed the first mailing of the questionnaire by 8 to 10 days. The post card reminder caused a substantial increase in returns between the 12th and 16th days, as illustrated in the chart on the previous page.

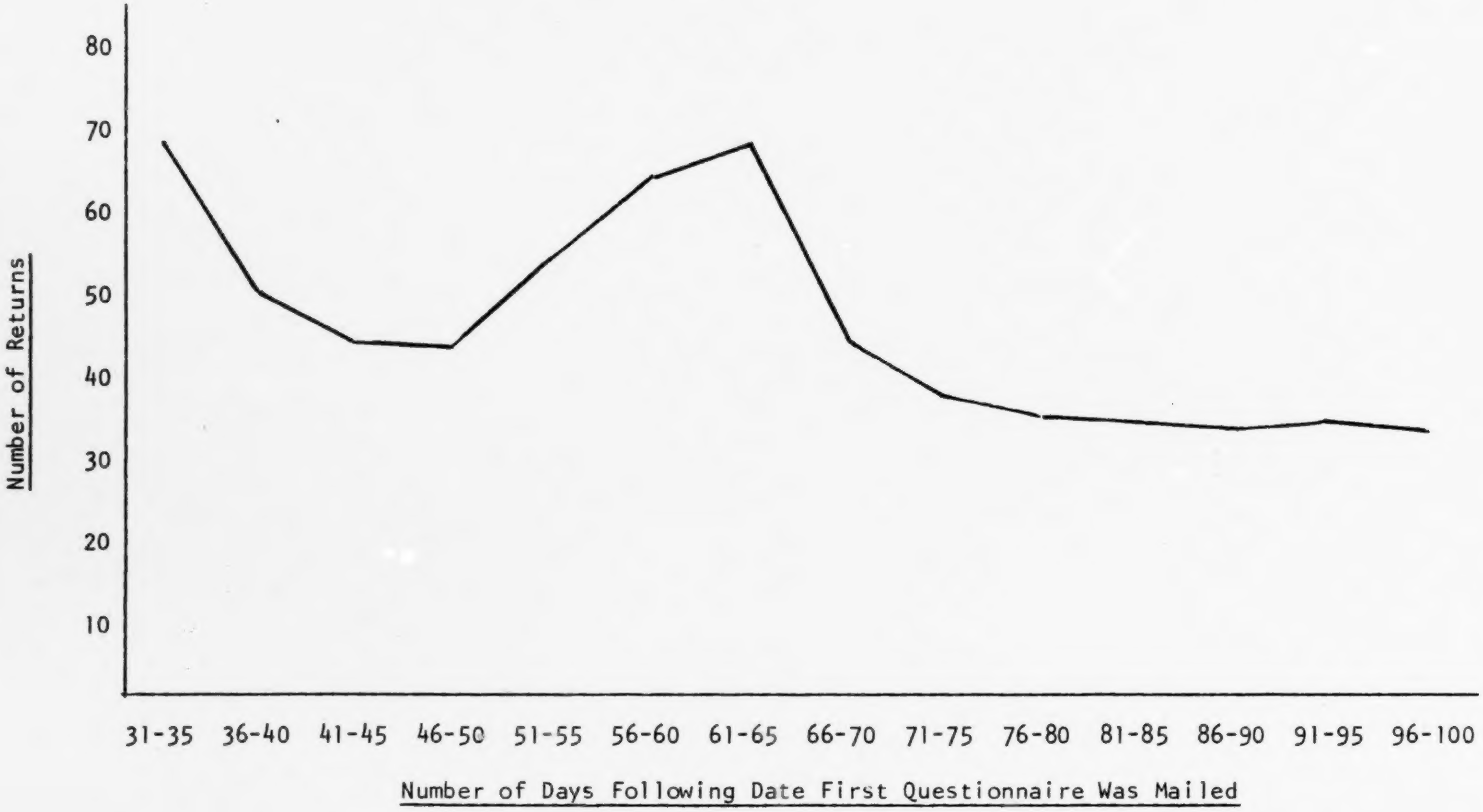
If the subject had not responded within five to six weeks following the first questionnaire wave, a second questionnaire and a new cover letter were mailed. This automatically was followed by a reminder card about one week later. The resulting increase in the rate of returns between the 50th and 70th days due to these mailings is illustrated in the next chart.

If following this series the subject had not responded, his name generally was forwarded to the field representative (FR) for further action. The FRs were asked to telephone or to write a personal appeal for cooperation. The names and addresses of 1,581 nonrespondents were forwarded to the FRs in this manner. The results were disappointing. As a group, the FRs contacted only about half (771) of the nonrespondents and, of this number, only 210 eventually returned completed questionnaires. The manner in which the nonrespondents were contacted by the FR and the specific results of each method are as follows:

	No. of Cases Contacted	No. Who Responded	Percentage Response
Contacted by phone or in person	331	81	24%
Wrote personal letter	379	115	30%
Contacted thru an intermediary	61	14	23%
All FR contacts	771	210	27 %

Noting the lack of success of our field representatives, a personal note was written by our staff and sent by certified mail to 1,195 nonrespondents in a "last ditch" effort to improve the response rate. This was our sixth and final routine mailing, and produced 211 additional returns.

These efforts brought the final response rate (based upon the number of persons for whom addresses were available) to 61 per cent. The period of activity described in this section spanned 340 days. About 52 per cent of all returns were received within the first 50 days following the date the original questionnaires were mailed, and about 80 per cent were received within the first 120 days. The cumulative rates at ten-day intervals are reported in Table 3.6.



FIVE-DAY RETURN RATES ILLUSTRATING THE EFFECTS OF THE FOLLOW-UP QUESTIONNAIRE MAILED
FIVE-SIX WEEKS AFTER THE FIRST WAVE

Response rates (based on good addresses) did not differ substantially by region although they differed markedly by school, with a low of 33 per cent from a small school in Arizona compared with a high of 84 per cent from a school in Minnesota. Most schools, nevertheless, clustered fairly close to the all-school mean, as shown in Table 3.7. It also will be noted in this table that the "overall" response rate (based on all cases) is significantly higher-than-average in the Central states and lower-than-average in the Western states. This primarily is due, as the figures in the next-to-last column on the right indicate, to the relative success (or lack of success) we had in locating missing persons from these areas. In the Central states only 10 per cent of the cases were lost, whereas this figure was never reduced below 28 per cent in the West.

If a questionnaire were returned with less than one-half of the items completed, we counted it as a refusal and made no further effort to contact the "nonrespondent." However, in editing the "good" questionnaires, 672 respondents (33 per cent of the total) had failed to complete one or more sections, or had skipped one or two pages or more. In every instance we sent these respondents a new questionnaire and asked them to complete the parts that had been left undone. 503 (or 75 per cent) complied with this request.

Response and Sampling Bias

Three separate methods were used to estimate the direction and amount of response bias in the EEO data set: (1) an interview follow-up of a subsample of the nonrespondents; (2) a comparison of the marginals for respondents, nonrespondents, lost cases, and deceased based on information obtained in the 1955 and 1959 ETS surveys; and (3) a comparison of the inter-item correlations for the original ETS sample and the total EEO and response samples on selected items from the original 1955 ETS questionnaire.

In Spring 1971, a one-in-five sample of the nonrespondents was selected for an intensive follow-up. 210 cases were selected. First, an attempt was made to interview by telephone the nonrespondent (or a relative) using a short questionnaire form containing information about the subject's residence, current employment, education, marital status and number of children. 159 telephone interviews were conducted. These interviews were brief, averaging only 2.8 minutes and costing about 70 cents per call. Most of the interviews were conducted with persons other than the respondent himself: Subject, 56 (35%); Spouse, 47 (30%); Parent, 43 (27%); and Other, 13 (8%). However, the information being requested was of the kind about which we presumed any member of the nonrespondent's family would have had adequate knowledge to answer our questions.

Seven other calls were completed but the subject or his intermediary refused to cooperate. The remaining 44 nonrespondents (or his family) who could not be contacted by phone were sent a one-page questionnaire soliciting

Table 3.6

Cumulative Return Rates at Ten-Day Intervals[1]

Days	Number of Returns	Cumulative Rates Number	Percentage
4-10	173	173	9.1%
11-20	458	631	33.1%
21-30	241	872	45.7%
31-40	118	990	51.9%
41-50	87	1077	56.4%
51-60	117	1194	62.6%
61-70	110	1304	68.3%
71-80	68	1372	71.9%
81-90	55	1427	74.8%
91-100	53	1480	77.6%
101-110	31	1511	79.2%
111-120	25	1536	80.5%
121-130	29	1565	82.0%
131-140	20	1585	83.1%
141-150	11	1596	83.6%
151-160	10	1606	84.2%
161-170	21	1627	85.3%
171-180	16	1643	86.1%
181-190	13	1656	86.8%
191-200	10	1666	87.3%

Table 3.6 (Continued)

Days	Number of Returns	Cumulative Rates	
		Number	Percentage
201-210	7	1673	87.7%
211-220	8	1681	88.1%
221-230	14	1695	88.8%
231-240	13	1708	89.5%
241-250	18	1726	90.5%
251-260	14	1740	91.2%
261-270	11	1751	91.8%
271-280	11	1762	92.3%
281-290	11	1773	92.9%
291-300	23	1796	94.1%
301-310	40	1836	96.2%
311-320	32	1868	97.9%
321-330	27	1895	99.3%
331-340	13	1908	100.0%

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[1] The rates reported in this table are based upon 1,908 cases rather than the total number of returns (2,077) due to lack of "dating" info on 169 cases.

Table 3.7

RESPONSE RATES AND LOST CASES, BY REGION AND SCH[illegible]

School I.D. Number	Region, State and Number of Respondents from Each School	Men	Women	A. Respon-ents	B. Non-res-pondents	C. Lost Cases	D. Dec-ceased	E. Class Total	Overall Response Rate (A/E)	"Lost Case" Rate (C/E)	"True" Response Rate (A/(A + B))
	ALL SCHOOLS	951	1126	2077	1338	668	68	4151	50%	16%	61%
	NORTHEAST	192	225	417	290	128	11	846	49	15	59
01	New Hampshire	11	9	20	7	3	0	30	67	10	74
02	Pennsylvania	14	13	27	16	2	1	46	59	4	63
03	New York	74	74	148	118	73	7	346	43	21	63
04	Pennsylvania	9	16	25	25	1	0	51	49	2	50
05	Pennsylvania	24	28	52	27	8	2	89	59	9	66
07	New Jersey	28	46	74	42	20	0	136	54	15	63
08	New York	32	39	71	55	21	1	148	48	14	56
	SOUTH	239	312	551	360	196	14	1122	49	18	60
09	Maryland	9	11	20	18	6	1	45	44	13	53
11	Oklahoma	12	14	26	11	7	1	45	58	19	70
12	Alabama	7	19	26	12	5	0	43	60	12	68
13	North Carolina	10	11	21	10	5	0	36	58	14	68
14	North Carolina	11	9	20	12	0	0	32	62	0	62
15	Alabama	7	9	16	16	3	0	35	46	9	50
16	North Carolina	8	16	24	26	3	2	55	44	6	48
17	Virginia	20	19	39	24	4	0	67	58	6	62
18	Florida	14	22	36	18	10	1	65	55	15	67
19	South Carolina	11	17	28	16	12	1	57	49	21	64
20	Florida	14	17	31	22	2	0	55	56	4	58
21	Tennessee	30	41	71	51	35	2	159	45	22	58
22	Mississippi	31	34	65	46	49	2	162	40	30	58
25	Tennessee	27	39	66	38	10	1	115	58	9	62
26	Alabama	28	34	62	41	45	3	151	41	30	60
	CENTRAL	387	430	817	476	147	34	1474	55	10	63
27	Wisconsin	9	3	12	10	4	0	26	46	15	54
28	Ohio	14	4	18	8	2	2	30	60	7	69
29	Illinois	12	7	19	9	0	0	28	68	0	68
30	Kansas	15	15	30	6	0	1	37	81	0	81
31	Minnesota	28	35	63	12	4	3	82	77	5	84
32	Michigan	23	33	56	24	8	4	92	61	9	70
33	Ohio	8	12	20	27	9	0	56	36	16	42
34	Minnesota	24	24	48	22	2	1	73	66	3	69
35	Nebraska	27	17	44	23	10	1	78	56	13	64
36	Illinois	119	125	244	193	74	11	522	47	14	56
37	Michigan	29	33	62	38	11	4	115	54	10	62
38	Missouri	13	35	48	19	3	1	71	68	4	72
39	Iowa	32	35	67	40	17	4	128	52	13	63
40	Wisconsin	34	52	86	45	3	2	136	63	2	65
	WEST	133	159	292	211	197	9	709	41	28	58
41	Arizona	3	4	7	14	4	0	25	28	16	33
42	California	12	11	23	5	3	1	32	72	9	82
43	Montana	12	23	35	16	14	0	65	54	22	69
44	California	26	29	55	50	44	3	152	36	29	52
45	New Mexico	16	24	40	36	48	1	125	32	38	53
46	California	64	68	132	90	84	4	310	43	27	60

information identical to that contained in the telephone interview. Eighteen completed and returned these forms. Thus, current data were obtained on 177, or 84 per cent, of the 210 nonrespondents in our subsample.

Table 3.8 presents a comparison of respondents and the nonrespondents in the one-in-five sample, by sex. It will be noted that the number of males upon which the percentages are based is substantially larger than the number of females in the subsample. This is due to the higher initial response rate for females compared in the EEO survey to males, 65 and 57 per cent, respectively. (The five-in-one sample was not stratified by sex, although probably should have been since the procedure we used produced a relatively small number of females for generalizing with much confidence to the female nonrespondents, as a group.)

The male respondents and nonrespondents do not appear to differ substantially in terms of employment status, marital status, and number of children. The male respondents, however, have completed more years of schooling than the nonrespondents (33 versus 21 per cent are college graduates) and the respondents are more likely than the nonrespondents to have moved out-of-state (33 versus 26 per cent). The latter though may be misleading due to the retrieval problem. That is, if data were available on missing persons (who we presume are migrants), the respondents and nonrespondents probably would not exhibit this difference. If a majority of the lost cases had moved out-of-state, the difference might actually be reversed.

The female respondents and nonrespondents do not appear to differ substantially in terms of marital status, number of children, or migration status. Like the male respondents, the female respondents have more schooling than the nonrespondents. But they also are less likely than the female nonrespondents to be working full-time.

In summary, then, the major findings of our comparison between the respondents and a one-in-five follow-up sample of the nonrespondents indicate that the EEO data underrepresents both men and women who did not go to college and women who presently are not working full-time.

In Table 3.9 we have presented another type of comparison. Marginals (in percentages) are given on several "critical" items selected from the original 1955 and 1959 ETS surveys for all nonrespondents (i.e., refusals), lost cases, and deceased, plus the respondents and the total sample. By inspecting the first and last columns in this table, one can compare the respondents with the full sample (of which the respondents are a part). Irrespective of the sources of bias, this perhaps is one of the more important comparisons to be made.

Regional differences, differences in class size, and differences in socioeconomic background (as measured by father's occupation) between the respondents and the total sample are all quite minor. On the other hand, the

Table 3.8

Comparison of Respondents and Nonrespondents (Five-In-One Sample), by Sex

	Males		Females	
	Respondents (N=947)	Nonrespondents (N=111)	Respondents (N=1130)	Nonrespondents (N=66)
What Are You Doing Now? (Multiple responses)				
Working full-time	92%	93%	27%	45%
Working part-time	5%	3%	14%	14%
Active military service	5%	4%	0%	0%
Attending a technical or business school	2%	3%	1%	2%
Attending college, graduate or professional school	8%	5%	5%	0%
Unemployed	2%	3%		
Education Completed				
Some high school	6%	14%	9%	14%
High school graduate	38%	43%	50%	63%
Some college	23%	22%	21%	15%
College graduate, or more	33%	21%	20%	8%
	100%	100%	100%	100%
Marital Status				
Never married	8%	9%	5%	6%
Married	88%	85%	90%	88%
Widowed, divorced or separated	4%	6%	5%	6%
	100%	100%	100%	100%
Number of Children				
None	16%	15%	10%	8%
One	18%	19%	11%	6%
Two	34%	32%	33%	36%
Three or more	32%	34%	46%	48%
	100%	100%	100%	100%
Migration Status				
In-state	67%	74%	70%	70%
Out-of-state	33%	26%	30%	30%
	100%	100%	100%	100%

Table 3.9

Comparison of Respondents, Nonrespondents, Lost Cases, and Deceased

	Respondents (N=2077)	Nonrespondents (N=1338)	Lost Cases (B=668)	Deceased (N=68)	All Cases (N=4151
Region					
Northeast	20%	22%	19%	16%	20%
Central	39%	36%	22%	50%	36%
South	27%	27%	29%	21%	27%
West	14%	16%	30%	13%	17%
	100%	100%	100%	100%	100%
Class Size					
25-49	14%	12%	7%	10%	12%
50-99	26%	23%	14%	24%	23%
100-299	35%	36%	45%	34%	37%
300 or more	25%	30%	35%	32%	28%
	100%	101%	101%	100%	100%
Scholastic Standing in High School					
Fifth quintile (low)	14%	25%	24%	24%	19%
Fourth quintile	15%	21%	20%	21%	18%
Third quintile	20%	19%	20%	18%	19%
Second quintile	20%	14%	9%	13%	16%
First quintile (high)	19%	11%	6%	10%	14%
No information	12%	11%	20%	15%	13%
	100%	101%	99%	101%	99%
How Left High School					
Graduated	88%	77%	56%	65%	79%
Discontinued	10%	20%	34%	31%	18%
Other (e.g., transfers)	2%	3%	10%	4%	3%
	100%	100%	100%	100%	100%
Father's Occupation					
Farm	13%	14%	12%	9%	13%
White-collar	30%	28%	32%	34%	30%
Blue-collar	52%	55%	53%	54%	53%
No information	5%	3%	4%	2%	4%
	100%	100%	101%	99%	100%

respondents are more likely than the average to have stood in the top two quintiles of their high school classes and, not surprisingly, they are more likely than others to have left high school by graduation.

Table 3.9 also identifies similarities and differences between the nonrespondents (refusals), the lost cases and the deceased. The lost cases (i.e., missing persons) differ from other nonrespondents (as well as the respondents) in some significant ways. They are more likely to have come from schools in the West and less likely to come from the Central states, they tend to come from larger rather than smaller schools, they had especially low academic standings in high school relative to others, and they were more likely than any others to have dropped out of school or to have transferred. On the whole, it appears that lost cases are a more important source of bias in our data than nonresponse or noncooperation.

If the primary objective of this study were to produce a set of descriptive statistics or to calculate national estimates of dropout rates, college-going rates, etc., then the sample and response biases discussed in this chapter would present a very serious problem. This report, however, does not deal with questions of this nature. Rather, it is a study of social mobility and the status attainment process. We, therefore, are not interested in the marginals per se, but in the interrelationships between items. It is the manner in which variables are related to one another that is most critical to any discussion of the causal network involved in these processes. Thus, the important question is: Would the correlations between the variables in our models differ substantially from those we actually obtained if everyone in the original sample or, ideally, the universe had been included in this study?

In order to answer this question, or at least to work toward an answer, eleven "status attainment" variables appearing in the 1955 ETS data set were intercorrelated. Separate matrices of these correlations (by sex) were produced for the total ETS sample (including the schools we had excluded in our sample design), the total EEO sample (labeled EEO_t in the accompanying tables), and the EEO respondents (labeled EEO_r). The interitem correlations are given in Tables 3.10 and 3.11, along with the means and standard deviations for each item.

For both sexes, the range (as measured by the standard deviations) is almost identical across samples for each item, and only in one case do the means differ substantially. This is the academic aptitude item. The EEO respondent sample is more selective (has higher scores) than the total EEO sample which, in turn, is more selective than the original ETS sample, thus producing an even more marked difference between the EEO respondent sample and the original ETS sample on aptitude. The magnitude of these differences is about the same for both males and females. Yet, the critical question is to what extent would these or other differences between samples alter the

Table 3.10

Comparison of Means, Standard Deviations, and Interitem Correlations Between ETS, EEO Total, and EEO Respondent Samples on Selected Variables

MALES ONLY

	A[1]	B	C	D	E	F	G	H	I	J	K
Means											
ETS	2.6	3.3	2.3	2.3	2.5	1.6	1.6	2.1	1.4	1.4	6.6
EEO_t	2.6	3.2	2.3	2.3	2.5	1.6	1.6	2.1	1.4	1.4	6.9
EEO_r	2.5	3.3	2.3	2.4	2.3	1.6	1.6	2.2	1.3	1.4	7.5
Standard Deviations											
ETS	1.8	1.6	1.1	0.8	0.9	0.5	0.6	0.7	0.5	0.5	4.0
EEO_t	1.8	1.6	1.1	0.8	0.9	0.5	0.6	0.7	0.5	0.5	3.8
EEO_r	1.8	1.6	1.1	0.7	0.9	0.5	0.6	0.7	0.5	0.5	4.0
Pearson Correlation Coefficients[2]											
A ETS		-.27	-.14	-.21	-.11	-.22	-.12	-.23	-.15	-.19	-.19
EEO_t		-.27	-.16	-.20	-.13	-.23	-.13	-.24	-.17	-.19	-.17
EEO_r		-.27	-.12	-.19	-.14	-.23	-.13	-.25	-.16	-.16	-.19
B ETS	4000		.24	.32	.19	.33	.17	.28	.27	.30	.31
EEO_t	1818		.29	.36	.22	.33	.21	.34	.32	.34	.33
EEO_r	852		.28	.35	.25	.35	.21	.33	.30	.32	.34
C ETS	3414	3005		.52	.27	.30	.25	.36	.41	.43	.17
EEO_t	1530	1389		.56	.27	.31	.25	.38	.43	.45	.22
EEO_r	718	667		.54	.24	.29	.22	.25	.43	.41	.20
D ETS	4622	3970	3412		.29	.38	.28	.41	.44	.45	.26
EEO	2038	1807	1531		.30	.39	.30	.44	.45	.49	.29
EEO	937	846	716		.27	.38	.29	.43	.44	.46	.28
E ETS	4565	3920	3359	4527		.31	.23	.33	.36	.38	.41
EEO	2019	1792	1512	2004		.32	.26	.36	.38	.41	.48
EEO	930	839	708	924		.32	.24	.35	.39	.42	.49
F ETS	4333	3735	3202	4300	4241		.27	.40	.48	.49	.37
EEO	1925	1703	1448	1913	1892		.30	.42	.48	.51	.37
EEO	889	801	686	884	877		.29	.41	.48	.49	.37

Table 3.10 (Continued)

	A[1]	B	C	D	E	F	G	H	I	J	K
G ETS	4632	3971	3398	4589	4534	4305		.46	.33	.34	.12
EEO	2055	1819	1532	2040	2020	1925		.48	.33	.36	.14
EEO	943	851	717	936	930	889		.45	.29	.30	.13
Hv ETS	4601	3947	3369	4559	4504	4276	4591		.50	.52	.24
EEO	2033	1802	1516	2019	1999	1905	2039		.52	.53	.29
EEO	932	841	710	925	920	878	932		.48	.53	.27
I ETS	3881	3339	2892	3848	3798	3611	3855	3833		.86	.26
EEO_t	1683	1499	1272	1674	1659	1582	1684	1666		.87	.33
EEO_r	769	698	598	765	759	727	768	761		.87	.33
J ETS	4169	3583	3096	4134	4075	3870	4142	4115	3732		.27
EEO_t	1832	1623	1383	1821	1801	1718	1831	1812	1616		.35
EEO_r	849	766	653	845	838	798	848	839	745		.35
K ETS	4690	4014	3428	4638	4581	4346	4650	4618	3891	4181	
EEO_t	2064	1826	1537	2046	2027	1931	2064	2042	1688	1837	
EEO_r	945	853	719	938	932	891	945	934	770	850	

[1] Symbols:
A) Number of siblings (0-6 categories)
B) Father's education (1-7 categories)
C) Plans of best friend to go to college (1-4 categories)
D) Number of friends planning to go to college (1-4 categories)
E) Sophomore academic standing in high school (1-4 categories)
F) High school curriculum, academic versus other (1-2 categories)
G) Discussed going to college with teachers (1-3 categories)
H) Discussed going to college with parents (1-3 categories)
I) Educational aspirations, college versus other (1-2 categories)
J) Educational expectations, college versus other (1-2 categories)
K) Academic aptitude (scores 0-20)

[2] Figures below the diagonal indicate the number of cases upon which the correlations are based.

Table 3.11

Comparison of Means, Standard Deviations, and Interitem Correlations Between ETS, EEO Total, and EEO Respondent Samples on Selected Variables

FEMALES ONLY

	A[1]	B	C	D	E	F	G	H	I	J	K
Means											
ETS	2.6	3.2	2.4	2.4	2.2	1.7	1.6	2.2	1.4	1.5	6.6
EEO_t	2.6	3.1	2.4	2.4	2.2	1.7	1.6	2.2	1.4	1.5	7.0
EEO_r	2.6	3.2	2.4	2.4	2.1	1.7	1.6	2.3	1.4	1.4	7.5
Standard Deviations											
ETS	1.8	1.6	1.1	0.8	0.8	0.5	0.6	0.7	0.5	0.5	4.0
EEO_t	1.8	1.6	1.1	0.8	0.8	0.5	0.6	0.7	0.5	0.5	4.0
EEO_r	1.7	1.6	1.1	0.8	0.8	0.5	0.6	0.7	0.5	0.5	4.1
Pearson Correlation Coefficients[2]											
A ETS		-.28	-.11	-.18	-.15	-.18	-.09	-.23	-.13	-.15	-.17
EEO_t		-.28	-.15	-.20	-.15	-.21	-.12	-.27	-.19	-.23	-.18
EEO_r		-.29	-.18	-.21	-.17	-.21	-.07	-.28	-.18	-.23	-.17
B ETS	4210		.23	.33	.18	.33	.15	.26	.23	.28	.29
EEO_t	1846		.28	.39	.21	.34	.20	.33	.31	.36	.28
EEO_r	1032		.28	.39	.22	.36	.22	.35	.31	.36	.27
C ETS	3990	3457		.55	.20	.32	.24	.37	.42	.44	.15
EEO_t	1685	1503		.58	.23	.33	.21	.38	.43	.45	.17
EEO_r	906	839		.59	.23	.34	.22	.36	.45	.49	.18
D ETS	4914	4210	3996		.29	.39	.31	.45	.47	.49	.23
EEO_t	2085	1844	1687		.31	.40	.27	.45	.49	.53	.25
EEO_r	1123	1032	909		.33	.40	.26	.45	.49	.53	.27
E ETS	4842	4147	3934	4840		.26	.20	.28	.27	.27	.44
EEO_t	2055	1816	1659	2052		.29	.22	.29	.30	.33	.50
EEO_r	1104	1015	891	1103		.28	.20	.30	.29	.33	.50
F ETS	4569	3932	3745	4568	4500		.28	.38	.48	.50	.30
EEO_t	1946	1730	1593	1945	1915		.23	.38	.46	.48	.31
EEO_r	1059	978	865	1059	1039		.23	.40	.46	.49	.31

Table 3.11 (Continued)

		A[1]	B	C	D	E	F	G	H	I	J	K
G	ETS	4888	4195	3970	4890	4817	4551		.45	.33	.33	.11
	EEO_t	2084	1842	1679	2081	2051	1943		.43	.30	.30	.13
	EEO_r	1122	1030	904	1121	1102	1057		.43	.26	.27	.12
H	ETS	4880	4179	3966	4881	4810	4544	4869		.52	.52	.19
	EEO_t	2085	1842	1683	2082	2052	1943	2081		.51	.51	.20
	EEO_r	1123	1031	906	1122	1103	1058	1121		.51	.52	.21
I	ETS	4334	3711	3551	4333	4271	4032	4314	4309		.83	.20
	EEO_t	1842	1633	1504	1841	1814	1716	1837	1838		.83	.24
	EEO_r	1003	921	822	1003	987	942	1000	1002		.82	.24
J	ETS	4407	3770	3615	4407	4343	4105	4392	4383	4167		.19
	EEO_t	1887	1664	1539	1886	1857	1760	1883	1884	1774		.23
	EEO_r	1030	943	843	1031	1013	971	1028	1030	968		.23
K	ETS	4941	4229	4011	4940	4866	4591	4915	4907	4354	4428	
	EEO_t	2095	1851	1690	2092	2062	1953	2091	2092	1847	1893	
	EEO_r	1127	1035	909	1126	1107	1062	1125	1126	1005	1033	

[1] See note on Table 3.10 for symbols.

[2] Figures below the diagonal indicate the number of cases upon which the correlations are based.

interitem correlations and thus the conclusions we might wish to draw later from our data on the EEO respondents. We should pay particular attention here to the correlation of aptitude with other status attainment variables since of all the sample characteristics examined in this chapter it represents one of our most serious biases.

The average difference between x coefficients for different sample comparisons is as follows (each average is based on 55 matched pairs):

	Males	Females
ETS and EEO_t samples	.024	.029
ETS and EEO_r samples	.023	.034
EEO_t and EEO_r samples	.016	.011

When all possible combinations are considered (N=330 pairs), the average difference between correlations is .023. In general the coefficients tend to be somewhat higher in both the EEO_t and EEO_r samples than in the original ETS sample. The fact that the correlations in the EEO_t and EEO_r samples are more similar to each other than either is to the ETS sample suggests that our main sources of bias are not low response rates but sampling error that arose when the schools were selected.

In any event, it does not appear that having under or overrepresented certain classes of individuals in the respondent sample seriously effects our correlations. Even in the case of academic aptitude, which in the EEO_r sample departs from its actual distribution more than any other variable, the differences observed in its correlation with other items are primarily a result of sampling error and not response bias and, in any case, are relatively minor. The largest difference that occurs is the .08 difference for males in the correlations between aptitude (K) and academic standing (E) when comparing the EEO_r and ETS samples (.49 and .41, respectively). The same pair of correlations for the females is .50 and .44, representing a .06 difference. Most other differences are much less than this.

Thus, in summary, we are left with the rather strong impression that neither sampling error nor response bias seriously effects or limits interpretation of the data presented in the following chapters of this report.

CHAPTER 4

VARIABLE MEASUREMENT

The 1970 follow-up questionnaire provides a wealth of data on a wide range of substantive content. The schedule itself is a 35-page document and includes 159 separately numbered items, most of which themselves contain multiple items. The 1955 ETS questionnaire contained 59 items in an 8-page booklet. Most of the variable measures used in this report were derived from the contents of these two schedules.

In addition to describing our variable measures in this chapter, we shall outline the various procedures employed in estimating missing data in each particular instance. Although the extent of missing data on individual items was generally moderate, usually in the 2-5 percent range, there was considerable independence in the incidence of missing data across variables and respondents. Consequently, the cumulative effect of deleting all cases with missing data on any variable in a given model would have been prohibitive. For example, such deletions would have reduced our male sample from 947 to 643 cases in the basic 16 variable model pertaining to the analysis of intra-high school experiences. This one-third reduction in our sample size we considered excessive, and various strategies were adopted for estimating missing data when logically and empirically sound procedures were available. The effect of the estimation procedures in toto was to raise the listwise-deleted sample size (that is, excluding respondents with missing data on any item) for this 16 variable model from 643 to 790 cases. Thus, missing data attrition was reduced from its original 32 percent to 17 percent. All multivariate analyses in this report will delete any cases with missing data after the estimation of missing values. Following the description of variable operationalization and estimation procedures, an assessment of the adequacy of the latter will be presented. The variables will be discussed roughly in the order of their introduction into the analysis.

(1) Family Background Status

A number of separate indicators of family background status will be employed in our anlaysis to tap various dimensions of background influence. In accord with Hodge's (1970) recent critique of the uses and abuses of single "SES" indicators, it is assumed that no single background variable can encompass the presumed effects of qualitatively different family background characteristics. In addition, Haug and Sussman's (1971) critical assessment of two commonly employed status indices, the Hollingshead 2 factor index and Duncan's SEI, should urge caution in the premature adoption of a single global indicator of social status for application to all substantive problems. By employing individual indicators of a variety of background characteristics, it is hoped that some estimates of their differential influences at various points of the child's status attainment processes can be detected.

The six indicators of family background status to be employed in the analysis are the following:

(a) Mother's Education--Parental educational attainment items were included in the 1970 schedule. Nine response categories were provided for each item: none, or some grade school; finished grade school; some high school; high school graduate; some college; bachelor's degree; some graduate work; master's degree; Ph.D. or professional degree. Numerical values of one through nine were assigned to these categories, with nine assigned to the highest level of educational attainment. Data on mother's education were not obtained in the original 1955 questionnaire.

Somewhat over 3 percent of the 947 males in the sample (41 cases) either failed to respond to this item or provided "do not know," or "does not apply" responses. These cases were assigned the total sample mean value on the mother's education item. This value was 3.47, which would correspond to between some high school and high school graduate.

(b) Father's Occupational Status--An item pertaining to father's occupational status "while you were in high school" was included in the 1970 schedule. A hierarchical set of census-type occupation prestige-status categories was constructed by reducing the set of ten pre-coded response categories down to six. The final six categories, reduced from the ten original categories presented in Table 4.1, are the following:

1. Unskilled and semiskilled workers.
2. Skilled workers, blue-collar foremen, craftsmen, and service workers.
3. Salesmen, clerical workers, and technical workers.
4. Small and large business managers and owners.
5. Professionals, typically not requiring advanced degrees.
6. Professionals, typically requiring advanced degrees.

This ranking scheme is consistent with the common ordering of census-type categories, with the possible exception of the relatively low placement of the "large business managers and owners" group (which was originally a discrete category). It was originally intended that this category would fall between the two professional ranks, but the relatively small number of cases involved (24 for the fathers of male respondents) and a quasi-validity check against estimated father's occupation SEI scores dictated that the two owner-manager categories (small and large) be combined.

The SEI estimation procedure involved a three-stage process as follows: the father's occupation description from the 1955 data set had originally been coded into 90 general occupational categories; in 1970 these categories had been recoded into a set of 96, roughly hierarchically ranked, occupation types to permit finer distinctions among sex-linked occupations; the 1970 coding scheme was similarly applied to data on son's occupation from the 1970 schedule; at the same time, son's occupation was assigned Duncan SEI values during the original 1970 coding process; estimates of father's occupation SEI scores were then obtained by applying the regression weights of son's 1970 occupational rank on his SEI to father's occupational rank. Thus, a set of predicted father's SEI scores were obtained through this multistage estimation-recoding.

Although little confidence is to be placed in the SEI estimate itself, it was felt that it could be employed as a rough check on the adequacy of our a priori collapsing of occupational categories. Table 4.1 presents the average SEI estimates within uncollapsed occupational ranks for males.

As can be seen from Table 4.1, the average SEI scores generally assume a rough progression which corresponds to our ordering of the categories. The sole prominent exception is the large business-executive group. This result is at least partially a function of the SEI's weighting on years of education (a weighting which is somewhat maintained in our ranking through the distribution between advanced degree and nonadvanced degree professional). Given the small number of cases involved and these SEI data, it seemed reasonable to combine the two owner-manager categories.

TABLE 4.1

AVERAGE ESTIMATED FATHER'S SEI SCORES WITHIN CENSUS-TYPE OCCUPATION CATEGORIES, FOR MALES

Occupation Category	$\overline{X}$ Father's SEI	N
1. Unskilled or Semiskilled Worker	47.45	200
2. Skilled Worker	46.93	265
3. Service Worker	43.70	39
4. Salesman or Retail Clerk	40.01	37
5. Office or Clerical Worker	53.60	13
6. Technical Worker	66.66	10
7. Small Business Manager or Owner	51.93	181
8. Profession, typically not requiring advanced degree	64.33	42
9. Large Business Manager or Owner	55.53	24
10. Profession, typically requiring advanced degree	72.85	24

No missing data were estimated for any of the occupational items employed in the analysis. Since non-respondents on the father's occupation item were excluded from the analysis, our final sample necessarily deletes youth from father-absent households. This, then, becomes another limitation on the representativeness of our sample. The actual number of respondents affected by this strategy is relatively small however. Some 7 percent of our male respondents (69 cases) indicated either that neither of their parents or only their mother was alive in 1955.

Son's present occupational status and first full-time occupational status were measured with the same six category ranking scheme as has just been described for father's occupation.

(c) Father's Education--Father's education was also obtained from the 1970 data with the same set of response categories as for mother's education. There were 41 cases with missing data on this item. Rather than assign the sample mean as an estimate, it was decided that a comparable item from the 1955 schedule could be employed to increase the accuracy of our estimation. The response categories for the 1955 father's education item correspond exactly with those in the 1970 schedule except that all post-graduate work is subsumed under the highest category in the former; whereas, the 1970 item distinguished between some graduate work, master's degree, and professional degree attainments. Responses on the two items have a zero order correlation of .82 for males and .85 for females.

Although most cases fall in the diagonal of the cross-tabulation of the two items, the correlation is high but far from unity, indicating that there are a number of discrepancies between the two indicators. Of the 947 males in the sample, 162 reported higher father's educations in 1970 than in 1955; whereas, 175 reported lower levels of education in 1970 than in 1955. Precluding the possibility of fathers actually losing years of education between 1955 and 1970, and assuming that 1970 figures would be more accurate, the latter discrepancies probably, in large measure, reflect the inflation of educational levels by the 1955 respondents. The former discrepancies, on the other hand, can combine both measurement error and instances where parents actually do have higher levels of education in 1970 than in 1955. It should be noted that most discrepancies are only one category off. Furthermore, employing the college-non-college difference as a significant breaking point, only 21 cases reporting fathers with at least some college in 1955 reported non-college categories in 1970. Similarly, only 19 cases gave a non-college response in 1955 and a college-going response in 1970.

Given the close correspondence between the two items, and assuming greater response accuracy in 1970 items as a general principle, the 1970 item was chosen as the basic datum. An additional desirable feature of the 1970 item was the finer distinctions it included at the upper levels of educational attainments. Thus, the 1955 item was employed to assign values to missing cases on the 1970 item. This assignment procedure saved 33 of the 47 male nonresponses on this item. Fifty-five of the 66 female missing cases were saved under the same procedure.

(d) Household Items Index--A factor weighted summated index of household possessions in the respondent's high school family household was constructed according to Maxwell's weighting scheme (Maxwell, 1971; Allen, 1972). The first step in the scale construction process is to subject the set of items under consideration to a principal factor analysis. The principal factor procedure extracts factors such that the average squared factor loading is at a maximum. Thus, the first factor constitutes that linear combination which maximizes extracted item variance (Nunally, 1967: 315-319).

A set of 22 household commodity items, ranging from the possession of a Bible to more than one bathroom, were subjected to the principal factor analysis. Based on the first analysis a subset of 18 items, those with factor loadings greater than .20, were subjected to a second factor analysis. One significant factor was obtained and the reliability coefficient for the factor weighted scale based on the factor loadings from this analysis was .84. Seeking to further refine the scale, a third factor analysis was performed on those items with factor loadings of .40 or greater in the second analysis. This procedure reduced the set of items to 13 with scale reliability of .83. Although the reliability coefficient remains essentially unchanged, the factor loadings for the variables in the second scale were somewhat larger and the first factor in the third analysis explained a somewhat greater proportion of the shared item variance than did the first factor in the second factor analysis. In addition, the greater parsimony of the 13 item scale provides the justification for its adoption. In this case, as in all later factor weighted indices, the factor analyses were performed on the entire sample, females as well as males.

Maxwell's reliability coefficient is a measure of the ratio of the squared factor loadings, or factor explained item variance, to the unique item variance, or one minus the estimated item communality. The computational formula for the reliability coefficient is:

$$r^2 = \frac{\sum_{N=1}^{i} f^2/1-h^2}{1 + \Sigma f^2/1-h^2}$$

Where: f^2 is the squared item factor loading,

h^2 is the estimated item communality.

Thus, the higher the ratio of shared factor variance to unique item variance across all items the higher the reliability of the composite scale for a given set of items. Maxwell's item weighting procedure follows the same logic. Each standardized item is weighted according to the ratio of its squared factor loading to its estimate of unique item variance. These weighted standardized items are then summed and the entire scale is weighted by its reliability coefficient. The scale construction formula is:

$$S = (1 - r^2)\Sigma \frac{f^2 i}{1 - h^2 i} X_i$$

Where: X_i is a scale item;

f^2 is a squared item factor loading;

h^2 is the item communality;

r^2 is the reliability coefficient.

Table 4.2 presents the 13 items included in the final Household Commodity Scale (Acquisition Index) as well as their factor loadings and estimates of communality. The items excluded from the scale on the basis of the preliminary factor analyses include the following: a radio; an electric refrigerator; a freezer; a TV set; more than one TV set; an air conditioner; a Bible; a dictionary; a family car. In general, these were the lower variance items in the set of 22.

Missing scale scores on the commodity index were estimated by regressing total parental income data (from the 1970 schedule) on the index

TABLE 4.2

HOUSEHOLD COMMODITY SCALE ITEMS, FACTOR
LOADINGS AND COMMUNALITY ESTIMATES

Item	Factor Loading	Communality
A telephone	.469	.403
More than 1 phone	.518	.359
A set of encyclopedias	.527	.333
More than 50 books	.536	.371
More than 200 books	.460	.274
More than 1 car	.371	.185
A typewriter	.558	.319
A bath tub	.515	.412
More than 10 phonograph records	.506	.267
More than 1 bathroom	.520	.531
A newspaper delivered daily	.482	.301
A magazine subscription	.493	.280
A map or globe of the world	.526	.328

and applying the obtained regression weights to the income data for those respondents with non-responses on the commodity items. The regression equation employed was:

$$\text{Scale} = 6.08 + .43(\text{Family Income})$$

The zero order correlation between the variables is .52. This procedure provided commodity index estimates for 13 of the 22 males with missing data.

(e) Relative Family Income--A relative parental income measure was obtained in response to the following item in the 1970 schedule: "Compared with the income or wealth of the parents of most other students in your high school back in 1955, which of the following would best describe your own parents' finances?" Available responses consisted of five categories ranging from "Far Below Average" to "Far Above Average." These categories were assigned numerical values from 1 to 5, with 5 assigned to the "Far Above Average" response.

Thirty-six of the 947 male cases failed to respond to this item. Another item from the 1970 schedule, measuring total family income in 1955 (as distinct from the relative income item now under consideration), was employed in estimating non-responses on the relative income item.[1] The Total Family Income item consisted of twenty-four categories (under \$2,000; eighteen \$1,000 intervals up to \$19,999; four \$4,000 intervals up to \$35,999; and an open-ended "\$36,000 and above" category). The categories were assigned numerical values from 1 to 24 in order of ascending income.

The estimation procedure involved the construction of an income deprivation score for each respondent who had supplied family income data but had left blank the item pertaining to relative parental income. Average family incomes were computed for each school in the sample. Respondents were then assigned relative income scores as the difference between their total family income and the total family average for their school. Relative Income Scores for the entire sample were then obtained for each category of the relative parental income item for which we intended to estimate missing data. The following relative income averages were obtained for the corresponding item categories:

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[1] It was decided not to introduce the family income item into the analyses as a distinct variable because of its high nonresponse rate: 94 of the 947 males, or 10.0 percent; the corresponding figure for females was 21.5 percent.

	$\overline{X}$ Rel. Inc. Score
Far Above Average	1.233
Somewhat Above Average	0.481
About Average	-1.124
Somewhat Below Average	-2.336
Far Below Average	-3.555

The midpoint of the difference between averages were computed and ranges determined for assigning the computed relative income scores to categories of the five level relative income item. Relative income scores in the following ranges were thus assigned to their corresponding relative income categories:

Computed Relative Inc. Ranges	Relative Income Categories
Greater than .852	Far Above Average
.852 to -.321	Somewhat Above Average
-.321 to -1.73	About Average
-1.73 to -2.95	Somewhat Below Average
Less than -2.95	Far Below Average

It is perhaps interesting to note the seeming discrepancy between perceived parental relative income and actual computed relative income scores. Those responding "about average" on the five category item actually had, on the average, negative relative family incomes (on the average, about $2,248) when in high school. Such results correspond to the often noted tendency of most citizens to designate themselves as members of the middle class. On the other hand, part, if not all, of this discrepancy may be attributable to the different comparison populations in the relative income items. Actual income scores are evaluated against the average parental income for the same high school respondents. Given our sample biases and the peak-year earning power of high school students' parents, these values are probably somewhat inflated over actual community-wide averages. Since the total community is the referent in the five category item, it is entirely reasonable that these values should be somewhat higher than the computed within-school deprivation scores.

Twenty-two of the thirty-six male nonrespondents on this item were retained through this procedure.

(f) Family Neighborhood Class Composition--Information was obtained on the perceived class composition of parents' neighborhood by responses to the following item: "Which of the following best describes the kind of neighborhood in which you or your parents lived 15 years ago when you were in high school: lower-class; working-class; middle-class; upper-middle or upper-class." These categories were assigned scores from 1 to 4, with 4 associated with the highest status neighborhood. The model response category for parental neighborhood status was "working class," with 48.1 percent of the males and 45.6 percent of the females making this response. The middle-class response was a close second, with 43.2 and 43.0 percent of the males and females respectively so responding. Table 4.3 provides a comparison of "Own Neighborhood" responses with those for parental neighborhood. Fifty-six percent of the males and 51.0 percent of the females describe their own current neighborhood as "middle class"; "working class" responses for "own neighborhood" drop to 26.6 and 27.3 percent respectively, probably indicating considerable perceived intergenerational neighborhood status upward mobility. The table entries indicate that the entire distribution for children relative to parents had shifted upward.

TABLE 4.3

OWN AND PARENTS' RELATIVE NEIGHBORHOOD
STATUS RESPONSES, BY SEX

	Parents' Neighborhood Status		Own Neighborhood Status	
	Males	Females	Males	Females
Lower-class	3.5%	3.6%	0.3%	0.6%
Working-class	48.1	45.6	26.6	27.3
Middle-class	43.2	43.0	55.6	51.0
Upper-middle or Upper-class	5.2	7.8	17.4	21.1
No response	8.8	6.6	8.3	6.4
N	947	1130	947	1130

Proceeding under the assumption of some degree of neighborhood class homogeneity in school attendance areas, cases with missing data on the parental neighborhood status item were assigned the mean score for all students in their schools. The range of school averages on this item varied between 2.0 and 2.9. Actually, the distribution was somewhat more homogeneous than this range might imply. Seven schools each fell at 2.5 and 2.6, and six schools had an average of 2.4, thus accounting for twenty of the forty-two schools in the sample. Of course, assigning the mean provided estimates for all missing cases.

(2) Academic Aptitude

Aptitude will be measured as scores on a twenty item academic aptitude test administered in the 1955 survey. The test taps both vocabulary and arithmetic reasoning. Stice and Ekstrom (1964: 10) describe the test as follows:

> The test, administered under untimed conditions, was constructed to give approximately equal weight to vocabulary and to arithmetic reasoning. It was designed for maximum discrimination between the sixth and eighth deciles of an unselected twelfth-grade population. Consequently, it was somewhat difficult for the tenth-grade population of the present study . . . reliability was estimated at .82 for the twelfth-grade sample.

The difficulty of the test for the sophomore sample is reflected in their relatively low average scores of 7.47 and 7.52 for the males and females respectively in our follow-up sample. It might be noted that the average for the entire 1955 sophomore sample was 6.95. The higher former figures reflect the bias of our sample in the high aptitude direction. Since all students took the academic aptitude test, there were no missing data on this item.

(3) Peer College Plans

An index of peer college orientations was developed to assess peer influences as "significant others" in affecting both academic performance and college plans. This peer plans index was constructed by summing responses to two pertinent items from the 1955 schedule. The following items were employed:

1. What are the college plans of the friend you most like?

Available responses were:

- a. Definitely planning to go to college, or is already in college.
- b. Thinking about college, and will probably go.
- c. Thinking about college, but will probably decide not to go.
- d. Not planning to go to college.
- e. Do not know.

2. Of the people your own age with whom you spend most of your free time, how many of them plan to go to college, or are already going to college? The response categories for the second item were:

- a. All of them.
- b. Most of them.
- c. Only a few.
- d. None.

With the "do not know" category excluded, the two items were simply summed to form the composite item. Missing data on one item were estimated from responses to the other item. In effect, when data on only one item was missing, the value of the second was doubled. The large "do not know" category for the item pertaining to the college plans of one's best friend was treated in a similar fashion. Fully, 23.8 percent of the males in our sample responded in this fashion. Rogoff (1962), commenting on a similarly high figure for the high school seniors from the 1955 sample, took this as an indication of the limited academically oriented discussion among high school students. A number of alternative explanations, however, come to mind as potential explanations for this figure. For example, a number of these students might have been social isolates without any particular "best friend."

Regardless of the explanation preferred, our estimation procedure can be conceptualized in either of two ways: if the student had provided a "codable" response to this item, it would most likely have been comparable to the response offered to the item regarding the college plans of "most friends"; or, not knowing the college plans of one's best friend magnifies the more generalized influence of "most friends."

The net effect of these procedures is to reduce the number of missing cases to eight for the combined items.

(4) High School Academic Performance

Measures of academic performance in high school were obtained for both sophomore and senior class standing. The sophomore measure included in the 1955 schedule as a quartile self-ranking was: "How good, on the average, have your high school grades been?" Response categories were: "in the top quarter of your class"; "in the second quarter of your class"; "in the third quarter"; "in the lowest quarter."

As can be seen from the distribution of responses in Table 4.4, the two middle categories are overrepresented, whereas considerably fewer than the "expected" 25 percent of the sample placed themselves in the lowest quartile. It is unlikely that this non-rectangular distribution can be entirely attributed to selective nonresponse and nonretrieval in our sample. The table values indicate that the entire sophomore and senior samples reflected similar self-report biases toward the intermediate categories. Insofar as the item combines both actual and perceived relative performance, it does not provide an entirely satisfactory "objective" measure of academic performance. Nevertheless, it is our only 1955 indicator of sophomore performance and will prove invaluable in our research. For the males in our sample, this measure of academic performance correlates .49 with scores on the previously described aptitude test. It also correlated .71 with the original senior quintile scores obtained from the schools in 1959.

TABLE 4.4

PERCENT DISTRIBUTION ON QUARTILE
SELF-PLACEMENT, FOR MALES

Quartile	A*	B*	C*
1	18.0%	14%	22%
2	36.8	33	39
3	37.8	39	34
4	7.4	11	5

A*: 1970 follow-up males.

B*: Total 1955 sophomore males (Stice and Ekstrom, 32).

C*: Total 1955 senior males (Rogoff, 1962, 20-21).

Senior class standing data[2] were obtained from the 1959 follow-up survey of high school principals and through a subsequent 1969-70 survey of schools. These data were obtained in two forms: actual class standing (from 1969-70 follow-up) and quintile placement (from 1959 follow-up). Although the two measures correlated quite highly, .93, a considerable number of schools failed to report actual class standing. Consequently, the quintile measure was adopted for our use. The class standing information was then transformed into quintiles and used to assign scores to those respondents for whom quintile standing had not been reported. This procedure reduced the number of male respondents with missing data on this item from 120 to 34.

Since a considerable number of missing cases still remained even after this estimation, a self-reported senior grade point average item from the 1970 schedule was employed to reduce this number further. The 1970 item consisted of ten response categories ranging from "A" down to "D or less" through half grade intervals. This scale correlated .76 with the original principal-obtained quintile standing. The estimation procedure involved the regression of senior grade average on quintile standing and the application of the obtained regression weights to the reported senior grade averages of those respondents with missing data on the quintile item. The actual estimation employed the following regression equation:

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[2] The information obtained was actually on the respondents' class standing at the time of departure from school. Thus, data on high school dropouts would not necessarily be for their senior year. However, since only 5 percent of our male respondents failed to complete high school, these class standing items can be treated as essentially senior level data.

$$\text{H.S. Quintile} = -.471 + .520 \text{ (H.S. Grade Average)}$$

The net effect of this two-stage estimation was to reduce the number of missing cases to one for the male sample.

The sophomore quartile and senior quintile class standing items will be employed separately in our various analyses. The sophomore item will be utilized principally as a within-high school performance measure in our high school level analysis, while the senior data will be used as a measure of overall high school performance in the examination of college-level attainments.

(5) Adult Influences

Two indicators of the influence of adult "significant others" were obtained from the 1955 schedule. The first item pertains to parents and asks, "To what extent have you discussed going to college with your parents or guardians?" The second item is directed toward school personnel and asks, "To what extent have you discussed going to college with the teachers or guidance counselors (advisors) in your school?" The response categories for both items were "not at all"; "some"; "quite a lot." It should be noted that these items are quite similar to those employed by Sewell in constructing his Significant Others' Influence. Although we have no evidence to support this point, it is assumed that the net effect of such discussions is generally toward the encouragement of college plans. There were only two male respondents with missing data on the teacher-counselor item and thirteen on the parental contact item. No attempts were made to estimate these missing values.

Previous research has combined such adult influence items with somewhat comparable peer data to develop a composite index of the influence of various "significant others" (Sewell, Haller, and Portes, 1969; Sewell, Haller, and Ohlendorf, 1970). It is arguable, however, that they should be kept conceptually distinct. The research of Coleman and McDill (Coleman, 1963, 1965), among others, should urge caution in assuming that adult and peer influences upon youth operate according to the same dynamics, or even in the same direction. Parental and teacher influences would seem to tap college urgings (although, given these particular items, we cannot assess the extent to which such discussions reflect attempts at discussion); whereas, our measures of peer influence more closely reflect potential modeling effects. One might expect previous academic performance to influence parental pressures to attend college, as Sewell, Haller, and Portes (1969) argue. Peer modeling, on the other hand, might actually exert a strong influence on performance. Multiple time-series data would probably reveal the entire process to be one of reciprocal influence. Until these issues regarding direction of influence are resolved, we would suggest keeping such measures separate. In our models, we will explore this alternative conceptualization of the influence of "significant others."

(6) Academic Self-concept

A factor weighted academic self-concept scale was constructed with Maxwell's weighting scheme in a fashion similar to the construction of the previously discussed index of household items. A set of ten items from the 1970 schedule pertaining to self-perceptions of academic performance, strengths, and weaknesses was subjected to a principal factor analysis. On the basis of its low factor loading (.294), one item was omitted from the set and the analysis was rerun. On the second analysis all nine items had factor loadings of .42 or greater and the first factor accounted for 66 percent of the shared item variance (the eigenvalue for the first factor was 3.11 as compared to 1.09 for the second). Maxwell's reliability coefficient for the weighted composite index constructed from this set of nine items was .895.

The items included in the index, along with their corresponding factor loadings and estimates of communality, are presented in Table 4.5. Four responses, ranging from strongly agree to strongly disagree, were available for each item. These items were included in the 1970 schedule among a larger series of statements pertaining to various high school experiences. Thus, the scale actually pertains to retrospective perceptions of high school academic strengths and weaknesses. Although it is likely that such perceptions have been somewhat affected by subsequent experiences, we must assume that such biases are not systematic.[3] In a recent analysis on the seniors from the original 1955 sample, Meyer (1970) was able to construct an "academic self-concept" index from three 1955 items. These items involved "low self-perception" reasons for not attending college (e.g., "I don't think I have the ability"). However, fully 16 percent (155) of the males in our sophomore sample skipped the entire series of fifteen "non-college-going reason" items in the 1955 schedule. We suspect that many students with relatively firm college plans felt that this section of the questionnaire did not pertain to them. Indeed, fully 78.2 percent of the males in our sample who did not respond to this set of items were "college-goers" while only 57 percent of the total male subsample had such high educational attainments. Given this selective nonresponse, we felt it necessary to employ the alternative items from the 1970 schedule in our analysis. Meyer made no mention of similar problems with senior nonresponses to this series of items.

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[3] To the extent that recollections of school problems are shaped by subsequent success or failure, this would inflate the correlations with attainment variables.

TABLE 4.5

ITEMS IN THE ACADEMIC SELF-CONCEPT SCALE, WITH FACTOR LOADINGS AND ESTIMATES OF COMMUNALITY

Item	Factor Loading	Communality
1. I usually did a bit more than the teacher required	.538	.481
2. I considered myself to be a fast reader	.589	.734
3. My grades reflected my ability fairly accurately	.423	.388
4. In class, I could seldom keep my mind on what the teachers were saying	.582	.455
5. Slow reading held me back in my school work	.636	.593
6. I wasn't able to concentrate on what I read	.774	.692
7. The tasks often seemed insurmountable in school	.524	.320
8. I kept up to date in my assignments by doing my work every day	.470	.462
9. I had trouble remembering what I read	.672	.581

Estimates of missing data were obtained by assigning the individual's average weighted item value to missing items for those respondents who replied to at least five of the nine index items. Forty-eight of the fifty-two cases with missing data were saved with this estimation procedure.

(7) Educational Expectations

Educational expectations was measured with an item from the 1955 schedule. The item was worded as follows:

"What do you think you will do when you finish high school? (Suppose you do not go into the military service.)"

The response categories available were:

1. Go to college
2. Work for a year or two and then go to college
3. Get a part-time job and go to college
4. Get a full-time job and go to college at night
5. Go to trade school, or take special training
6. Get a job
7. Become an apprentice
8. Other

Categories 2 through 4 were collapsed into a "possible college" group and 5 through 7 were designated non-college goers. Approximately one-third of the males fell into each of these groups, including the first category. About 70 males circled the "other" category. An inspection of how these particular respondents replied to an item in the 1970 schedule pertaining to their actual activities six months after high school, which employed the same set of response categories, revealed that most could be classified as "non-college goers." Fully 59 of the 70 fell into this category. All 70 of the "other" respondents were assigned to the "non-college going" educational expectation category.

Thirteen of the twenty-seven nonrespondents to this item were saved by assigning them their response on a comparably worded item pertaining to educational aspirations. This latter item will not be employed in the analysis in this report as a separate variable. The educational aspiration and expectation items correlate .83 with one another.

(8) Educational Attainments

Educational attainments were measured with the same set of categories employed in the father's education item. Since our sample consists of high school sophomores in 1955, the categories of this item ranged from "some high school" (50 of the 947 males) to Ph.D. or professional degree (64 cases). There were 18 nonrespondents on this item, and no attempts were made to estimate values for these cases. The average educational attainment score for respondents was 5.26, which corresponds to between some college and college graduate. The modal category, on the other hand, was "high school graduate," with 354 of the 947 males in this category. The mean father's education, in comparison, was 3.25, or between "some high school" and "high school graduate." This intergenerational difference is probably somewhat exaggerated since our sample excludes pre-sophomore dropouts and is probably underrepresentative of low achievers.

(9) Occupational Attainments

Early and present occupational statuses were measured with the same set of hierarchically ranked categories described for the father's occupation item.

Early occupational attainments were measured by responses to an item asking for "the first job engaged in when you finished school or college." Fully 35 percent of the males responded in the unskilled or semiskilled worker category. This can be compared with only 8 percent in the lowest category on the present occupation item. Similarly, the difference in sample means for the first and present occupations implies considerable net upward career mobility. These means are respectively, 2.57 and 3.46. The first falls between the skilled worker and salesman-clerical categories; whereas, the second is between the salesman-clerical and small-large business owner-manager categories. It might be noted, though, that the first occupation item wording, referring to their first job held after the completion of school or college, could be interpreted in such a way as to draw responses toward the low end of the scale. Persons could conceivably respond in terms of low status temporary jobs, or in terms of jobs held between the high school-college transition if this was not immediate, rather than their initial major full time occupation. Nevertheless, these figures do imply considerable overall job upgrading over the fifteen year career span potentially encompassed by the data.

Finally, it might be noted that the average father's occupation score was 2.56, which corresponds quite closely with the average son's first job score. Since, presumably, the father's occupation item pertains to occupations during the peak career years (probably most parents of high school sophomores would fall into the 35 to 45 age bracket), these figures similarly imply considerable intergenerational occupational upgrading.

(10) High School Contextual Variables

A total of four contextual variables were developed to measure aggregate features of the high school environment. Two average school aptitude measures were constructed to tap the academic-competitive dimension of the school environment and two aggregate measures of father's education were devised to explore social class composition effects. All contextual variables were constructed from data on the entire 1955 sample (4150 cases), and not just the 1970 follow-up subsample. In addition to distinguishing between ability and status dimensions of the school environment, each measure was computed for both the total school and within curricula (dichotomized as college preparatory versus "other").

The within curriculum contextual measures will permit us to explore aggregate effects of the more immediate social envornment. Most studies of contextual effects in the educational attainment process have been restricted to schoolwide aggregate measures. On the other hand, much of the research on the performance consequences of integrated school settings point to the importance of classroom contexts as interaction environments (USCCR, 1967). Although we have no classroom data, it is assumed curriculum participation provides a meaningful interaction and competitive setting. Particularly in larger schools, it would seem that the common curriculum group provides a more meaningful social unit for the application of the reference group theories upon which most educational contextual analyses are based than does the school as a whole.

The school-wide contextual measures are simply within school average academic aptitude scores and average father's education. The aggregate education measure is based on the father's education item from the 1955 schedule. Thus, the individual and aggregate father's education items are not entirely comparable, since the former is derived from the 1970 schedule.

Both contextual items manifest considerable variation about the total sample averages. Average school aptitude scores ranged from a low of 2.23 for a sophomore class of 67 students to a high of 9.03 for a class of 136. Similarly, average level of father's education ranged from a low of 1.76 (between "some grade school" and "finished grade school") to 4.23 (just above "finished high school").

An inspection of the average scores within curricula within schools reveals a distinctive breaking point between the college preparatory curriculum and all others (general, vocational, business, and "other"). Given these results, and the generally small size of the classes we are dealing with,[4] it was felt that the dichotomization of the curriculum control was both justifiable and desirable. The data do indeed reflect between curriculum differences in student composition. The average aptitude score for students enrolled in an academic curriculum was 8.77 (well above the total sample mean of 6.94) as compared to the 6.01 average for students in all other curricula. Simiar differences were obtained in average father's education comparisons: 3.96 (just below "finished high school") for the college preparatory students and 2.89 (just below "some high school") for all others.

Since many of the school curriculum enrollments were quite small, some relatively arbitrary cutting point had to be established below which it would not be meaningful to treat the curriculum population as a discrete social entity. The size of 20 was chosen as that point. It was felt that 20 or greater students was a sufficiently large number for the group to be treated somewhat uniquely administratively (i.e., distinctive curriculum oriented coursework, advising, etc.) and to provide a comparative reference group. Thus, students enrolled in a curriculum with at least 19 other students were assigned within-curriculum contextual variable scores. Those in smaller curricula were assigned schools averages. For the academic aptitude contextual variable, 26 of the 42 academic enrollment totals fell below this point, as did one of the non-college preparatory totals. The corresponding figures for the educational contextual variables were 28 and 2, with the increase being due to a higher incidence of missing data on the father's eduation item.

Finally, the 56 respondents who failed to report a high school curriculum were assigned their school means. Thus, in summary, the construction of the within curriculum contextual variables proceeded as follows:

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[4] Only 14 of our 42 sophomore classes exceeded 100 students; fully 14 were under 50 in size--counting both respondents and nonrespondents, (Eckland and MacGillivray, 1972).

curriculum averages were assigned if curriculum enrollment was at least 20; if curriculum enrollment fell below 20, school averages were assigned instead of curriculum averages; nonrespondents on the 1955 schedule curriculum item were assigned school averages for these contextual variables.

The intercorrelation of these contextual variables with one another as well as with their corresponding individual level variables are presented in Table 4.6. The correlations are based on an N of 790, which is obtained through the listwise deletion of cases with missing data (after estimation) on any of the variables just described. As can be seen from the correlation matrix, the individual level variables are only modestly correlated with the various contextual variables, with correlations in the .20-.40 range. The contextual variables are somewhat more highly intercorrelated, particularly the corresponding schoolwide and curriculum specific indicators. Yet even here, no correlation exceeds .846 (for school father's education and curriculum father's education), implying some independent variation of the two measures. School and curriculum indicators will not be employed simultaneously in any analysis.

This discussion of the high school contextual variables completes our description of the variables to be employed in our models of the general attainment processes and the within high school specification of the dynamics of these processes. Of the 947 males in our follow-up sample, 790 are retained when cases with any missing data after estimation are deleted from the analysis. This figure would have dropped to 643 had no missing data estimates been employed. The first section of our analysis will be based on this sample of 790 males.

At this point we will turn to a consideration of the additional variables to be included in the analysis of college level models. All college level variables were derived from the 1970 follow-up schedule. Of the total of 525 males with at least some college education, some 67 cases were lost with the listwise deletion of missing cases on the preceding set of variables. This reduced our maximum possible college sample size to 458. An additional 87 cases were lost in the operationalization of the following variables, reducing our usable male college sample to 371.

The additional variables for the college level analysis include:

(11) Freshman Grade Point Average

College freshman grade point average was obtained from the 1970 schedule. A ten category precoded scale was provided with categories ranging from "A or A+" to "D or less" in half grade intervals. Both letter grades and numerical grade point averages (based on a 0 to 4.0 scale) were associated with each response category. Twelve percent of the 525 male respondents who claimed at least some college education failed to respond to this item. No estimates of missing data were attempted.

TABLE 4.6

INTERCORRELATION MATRIX OF CONTEXTUAL AND CORRESPONDING INDIVIDUAL LEVEL VARIABLES

	Respondent Aptitude	Father's Educ.	School $\bar{X}$ Aptitude	Curriculum $\bar{X}$ Aptitude	School $\bar{X}$ Fath. Educ.
Fath. Educ	.354				
School $\bar{X}$ Apt.	.227	.237			
Curric. $\bar{X}$ Apt.	.380	.304	.732		
School $\bar{X}$ Fath. Ed	.198	.312	.648	.545	
Curric. $\bar{X}$ Fath. Educ.	.305	.389	.555	.798	.846

(12) Intended Freshman Major

An item in the 1970 schedule asked for the academic major that, as freshmen, the respondents eventually intended to pursue. These responses were divided into "high performance" and "low performance" intended majors roughly corresponding to Davis' dichotomy (1964: 7-11; 1966). The following majors were included in the low performance category: agriculture; business; education; home economics; nursing; physical education; and "other" majors. The following were designated "high performance career" majors: the arts and humanities; the biological sciences; the physical sciences; the social sciences; engineering; dentistry; law; and medicine. Of the 472 males responding to this item, 152 fell into the low performance intended major category.

(13) Collegiate Academic Self-concept

A factor weighted academic self-concept index for the college-going sample was constructed according to Maxwell's weighting formula. Five seemingly pertinent items from the 1970 schedule were subjected to a principal factor analysis. Only the first factor eigenvalue exceeded 1.00, and the first factor accounted for 72.5 percent of the shared item variance. The reliability coefficient for the five item scale was .716. One item had a factor loading below .40, and the analysis was rerun with this item deleted. The first factor on the second analysis accounted for fully 87.2 percent of the shared item variance and provided a factor weighted scale with a reliability coefficient of .756. Nevertheless, one factor loading still fell below .40 on the second analysis. This variable was deleted and a three item factor analysis was performed. Although the reliability coefficient dropped somewhat for the resultant scale, down to .737, all factor loadings were uniformly high and the first factor accounted for 93.2 percent of the shared item variance.

TABLE 4.7

ITEMS IN THE COLLEGIATE ACADEMIC SELF-CONCEPT SCALE*

	Factor Loading	Communality
Learning how to study	.774	.601
Keeping up with my grades	.635	.447
Lack of preparation in high school	.586	.395

*Item Wording: To what extent did the following difficulties interfere with your undergraduate education?
Response Categories: Greatly; Somewhat; Not at all.

This three item scale was adopted for the college level analysis. Cases with nonresponses on only one of the three items had the missing value estimated as the average of their weighted values of the other two items. The three items used in the scale construction, along with data on factor loadings and estimated communality, are presented in Table 4.7. Of the 525 male college-goers in our sample, 445 had originally responded to all three items in the scale. An additional ten cases were retained through this estimation procedure.

(14) College Persistence

A three value indicator of college attrition was constructed to explore the influences of contextual and individual variables on the dropping out of college. Although this item will not be incorporated into our path models, it will be examined in the course of the college level analysis. Its tautological correlation with years of education obtained precludes its employment as a discrete variable in the models to be examined. The three item categories are: never dropped out; dropped out and returned (which does not necessarily imply eventual graduation, since nearly half of these cases dropped out a second time); dropped out and never returned.

(15) Educational Attainments

This is the same item as employed in the general and high school analyses, but with the response categories appropriately truncated. The possible levels of educational attainments for the subsample of male college-goers, with the numbers falling in each, include: some college (214); bachelor's degree (117); some graduate work (65); master's degree (65); Ph.D. or professional degree (64). No explicit instructions were provided for the placement of professional master's degrees (Master of Social Work, etc.), but it is assumed that these would be included in the "master's degree" category.

(16) College Selectivity

College selectivity scores have been assigned to first and last undergraduate institutions attended using Astin's Estimated Selectivity Level index. Selectivity is defined as "the total number of highly able students who want to enroll at the college divided by the number of freshmen admitted. Thus, the greater the number of these bright students who apply, relative to the number admitted, the more 'selective' the institution can be" (Astin, 1965: 55). Operationally, selectivity scores were assigned to colleges by dividing the number of National Merit Scholarship semi-finalists and recipients of the Letter of Commendation who named a given school as one of the two colleges they would most like to attend by the number of students admitted in the Fall of 1961 (Astin, 1965: 25). Since Astin's scores were for 1961, these values are only slightly outdated for those sophomores in our sample who entered college immediately following high school graduation (1957). We suspect that there would be very little change in college ranks over this short period.

A sizable number of respondents either attended junior colleges or four year institutions which were not included in Astin's analysis. Hence, Astin selectivity scores could not be directly assigned in these cases. Since the Astin scale presumably measures the academic competitiveness of the student body, average aptitude scores within college selectivity categories were used to determine the placement of these non-coded types within the Astin scale. The average aptitude score for students attending four year colleges not ranked in the Astin scale was 8.74 for the 76 cases (male and female); for junior college students the average aptitude score was 7.87 (N= 100); and, for those attending "other unlisted colleges," it was 7.46 (N= 50). These average scores corresponded quite closely to the average aptitude scores of students in the lowest Astin categories which had 10 or more students from our sample. The average aptitude score for the 19 students attending schools with A in ranks of 11 was 6.21; that for the 59 students attending schools with an Astin rank of 37 was 8.68. Thus, students attending unranked four year colleges were assigned scale values of 37, and students attending junior colleges or "other colleges" were assigned to category 11 of the Astin Selectivity Index.

It might be noted that the average aptitude scores do demonstrate a rough progression with increasing college selectivity, as this assignment procedure postulates. The lowest average aptitude for a category with 10 or more students is 6.21 for scale score 11; the highest aptitude level is 12.7 for students attending schools scored 66. No category below 55 has an average aptitude score above 9; no category at or above 55 has an average aptitude that falls below 9. This individual aptitude-college selectivity relationship is reflected in the .282 correlation between the two with the three "assigned" categories omitted.

N

TABLE 4.8

CORRELATIONS OF ASTIN SCALES WITH APTITUDE ITEMS

	Astin 1*	Astin 2*
Aptitude	.282	.263
Average aptitude	.205	.196

*Astin 1: with assigned categories deleted
Astin 2: with assigned categories included

It was of concern that employing average aptitude scores to determine the placement of the three uncoded categories might artificially inflate the relationship between the two variables. Since both are to be employed simultaneously in the college-level analysis, the Astin scale with assigned categories included and deleted was correlated with our aptitude items to examine the extent of this inflation. Table 4.8 presents these correlations for the total sample.

As can be seen the assignment has essentially no effect on the scale's correlation with the aptitude items. Indeed, with assigned categories included, the correlation with individual aptitude actually declines somewhat. This is probably attributable to the considerable variation in the aptitude scores of the 226 respondents in the three college categories who were uniformly assigned relatively low selectivity scores.

(17) High School Curriculum

On the basis of results to be discussed later, it was decided to introduce curriculum enrollment into the analysis as a discrete variable. Curriculum enrollment was obtained from an item in the 1955 schedule. The curriculum item was dichotomized into "college preparatory" and "other" categories. The "other" group includes those enrolled in business, vocational, general, and "other" curricula. Of the 790 youth in the high school level analysis, 742 also responded to this item. Of these, 45 percent were enrolled in college preparatory curricula. When the 48 nonrespondents are added to the non-college preparatory category, this percentage drops to 42. In order to retain the comparability of our samples in each particular analysis, the curriculum item was employed with nonrespondents assigned to the "other" category.

Evaluation of Estimation Procedures

An inspection of parallel analyses with nonrespondents deleted and assigned revealed no notable biasing effects due to the assignment strategy. Summary figures on the extent of missing data for each of the variables just

TABLE 4.9

NUMBER OF CASES INITIALLY MISSING AND NUMBER RETAINED THROUGH ESTIMATION-ASSIGNMENT PROCEDURES FOR ALL VARIABLES, FOR THE MALE SUBSAMPLE

Item[a]	Initial Missing Cases	Number Retained
1. Mother's Education	41	41
2. Father's Occupation	64	--
3. Father's Education	47	33
4. Acquisition Index	22	13
5. Relative Family Income	36	22
6. Family Neighborhood Status	84	84
7. Academic Aptitude	0	--
8. Peer Plans	9	8
9. Sophomore Class Quartile	17	--
10. Senior Class Quintile	120	119
11. Parental Contact	13	2
12. Teacher-Counselor Contact	2	--
13. High School Self-concept	52	48
14. Educational Expectation	27	13
15. Educational Attainments	18	--
16. Early Occupational Status	44	--
17. Present Occupational Status	44	--
18. High School Aptitude Context	0	--
19. High School Status Context	0	--
20. College Freshman GPA	64	--
21. Intended Freshman Major	60	--
22. College Self-concept	80	10
23. College Persistence	80	--
24. College Selectivity	53	--
25. High School Curriculum	56	56

[a] The sample size for items 1 through 19 and 25 was 947. That for items 20 through 24 was 525.

discussed and the number of respondents retained through our various estimation procedures are presented in Table 4.9.

The various missing data estimation procedures which we have described in the course of outlining our variable operationalization strategies have increased our usable male sample size from 643 to 790 for the high school analysis and from 351 to 371 for the college-going subsample. As our descriptions indicate, no single estimation strategy was relied upon exclusively. The procedure adopted for a given item was dictated by the range of options available and their relative merits. In many instances, no reasonable strategies were evident and, hence, no estimation was attempted. In concluding this section we wish to briefly examine any biases introduced to the data set as a consequence of these various procedures. This discussion assumes that nonresponses on particular items are essentially randomly distributed.

Distortions due to estimation may occur in either of two ways: the actual estimated values may alter the distribution of the variable under consideration; or, if nonrespondents have some peculiar characteristics, the additional cases included in the sample may affect the distribution of other items. The data presented in Tables 4.10 and 4.11 should permit us to assess the seriousness of these potential consequences of estimation.

Table 4.10 compares the means and standard deviations of the variables in the preliminary and high school analysis for both males and females, with and without estimates of missing values. Since the academic aptitude item has no missing values, differences on it can be attributed to the influence of the additional cases saved in the estimation procedure. The largest change in the aptitude item involves a .08 decrease in the female average aptitude level when cases with missing data are retained in the analysis. For males, the only aptitude difference is a .02 reduction in average aptitude level with the inclusion of the 150 saved cases. An inspection of the table entries reveals no dramatic influence for the various estimates of missing values.[5]

Table 4.11 permits us to explore changes in the pattern of inter-item correlations for this set of variables when estimates of missing values are included in the analysis. Table entries are the differences in zero order inter-item correlations between the set of variables with estimates and the set with no estimates. A plus sign indicates that the correlation with estimates exceeded that without estimates; a negative sign indicates that the correlation without estimates was the higher of the two.[6]

The table entries indicate that inter-item correlation differences are generally negligible. The largest differences involve a .04 increase in the correlation of father's education with educational attainments and relative family income with sophomore class quartile when missing value estimates are included. Although estimates neither consistently increase nor decrease the correlation coefficients, the modest changes are somewhat more likely to be in the direction of raising the coefficients. Of the 98 male comparisons involving some change, 59 were higher for the correlation with estimates. Nevertheless, the generally quite modest magnitude of change implies that our estimation procedures have not substantially affected the patterns of interrelationship among the variables in our sample.

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[5] Since the use of the original Peer Plans Index without estimates or assignments would have resulted in a sizable reduction of our sample size due to the large "Do not know" category for best friend's plans, the Peer item in Tables 2-10 and 2-11 includes estimates in all instances.

[6] Male inter-item correlations are above the diagonal; female correlations are below the diagonal.

TABLE 4.10

MEANS AND STANDARD DEVIATIONS OF VARIABLES UNDER ANALYSIS, WITH AND WITHOUT MISSING DATA ESTIMATES, BASED ON CASES WITH INFORMATION ON ALL ITEMS

	Males				Females			
	With Missing Data Estimates		Without Estimates		With Missing Data Estimates		Without Estimates	
Item	Mean	SD	Mean	SD	$\overline{X}$	SD	$\overline{X}$	SD
S1*	3.53	1.35	3.45	1.33	3.46	1.44	3.48	1.47
S2*	2.59	1.37	2.54	1.33	2.52	1.41	2.53	1.41
S3*	3.28	1.72	3.23	1.68	3.24	1.89	3.24	1.90
S4*	0.032	0.893	0.011	0.870	0.048	0.937	0.086	0.922
S5*	3.00	0.802	2.98	0.786	2.98	0.795	2.98	0.771
S6*	2.52	0.623	2.52	0.649	2.56	0.666	2.58	0.682
Apt	7.58	3.90	7.60	3.90	7.77	4.10	7.85	4.12
Peer*	4.99	1.58	5.01	1.57	5.05	1.68	5.05	1.66
Stand 1	2.69	0.853	2.69	0.849	2.93	0.814	2.93	0.808
Teach	1.63	0.613	1.64	0.611	1.60	0.609	1.60	0.604
Parent	2.20	0.676	2.22	0.670	2.32	0.664	2.34	0.656
Imag 1*	0.831	0.787	0.824	0.796	1.148	0.840	1.144	0.825
Edex*	1.92	0.839	1.92	0.837	1.88	0.888	1.90	0.896
Educ 1	5.30	1.62	5.32	1.61	4.74	1.26	4.74	1.24
Occ 1	2.60	1.59	2.57	1.56				
Occ 2	3.47	1.52	3.48	1.53				
N	790		643		940		789	

*Items with missing data estimates.

Finally, an inspection of parallel path analyses for items with and without estimates for the preliminary and high school models revealed no dramatic differences between models. (Actual tables are not included in the project write-up.) Given this series of comparisons which reveal negligible changes due to missing data estimation procedures, we shall perform our actual analysis on the set of items with missing data estimated.

It is recognized that some of our measures do not constitute "ideal" operationalizations of our variables. This is particularly true of some of the items from the 1955 schedule (such as the response categories in the item asking educational goals). Problems such as these would seem to be almost inevitable in long-term longitudinal projects, where hindsight, shifts, shifts of interest, advances in the field, and changes in project personnel almost assure some dissapointment with the original data.

TABLE 4.11

DIFFERENCES IN ZERO ORDER INTER-ITEM CORRELATION COEFFICIENTS BETWEEN THE SET OF VARIABLES WITH MISSING DATA ESTIMATES AND THE SET WITHOUT ESTIMATES, BY SEX[a,b]

Males

	S1	S2	S3	S4	S5	S6	Apt	Peer	Stand 1	Teach	Parent	Imag 1	Edex	Educ 1	Occ 1	Occ 2
S1		-01	00	-01	+01	-02	-01	+01	-01	-01	-01	00	-01	00	00	-01
S2	-02		+01	00	+.01	-.04	+01	+01	+02	+.03	+02	00	+01	00	+02	+.03
S3	-01	-01		+02	-01	-02	+02	+01	+01	+01	+03	-01	+01	+04	+03	-01
S4	+01	00	-01		-01	-02	-01	+02	00	+02	00	-03	00	+03	+02	00
S5	00	-03	-04	-02		-02	+02	00	+04	+01	-01	+02	00	+02	00	00
S6	00	-01	-02	-01	-03		+01	00	00	00	-01	-01	-02	00	00	-03
Apt	-01	00	00	00	+01	00		-01	+02	-01	+01	-01	+01	+02	+02	-01
Peer	-03	00	-01	-02	-02	-02	00		00	00	00	-01	+02	+02	+03	+01
Stand 1	-01	00	-03	00	00	00	+01	-01		-01	-01	00	00	+02	+01	-.01
Teach	+02	00	+01	+01	+02	-01	-01	-01	+02		+01	00	+01	+01	-01	00
Parent	00	-01	-03	00	-01	-02	-01	00	-02	+01		+01	00	+03	00	+02
Imag 1	-01	+01	-01	00	-01	-01	+02	-02	+01	-03	-01		-01	-02	-01	-01
Edex	00	+01	00	-01	00	-01	+01	00	00	00	+01	00		+01	+02	00
Educ 1	00	-01	00	-01	00	-01	+02	+01	+02	-01	-01	+02	+02		+03	00
Occ 1																+02

Females

---

[a] Correlation coefficients rounded to two digits.

[b] A positive sign indicates that the correlation coefficient with estimates was the higher of the two.

Nevertheless, the obvious merits of such longitudinal projects would seem to far outweigh these liabilities.

The following is a list of variable abbreviations to be employed in our path models and tabular presentations of data throughout the analysis:

S1: Mother's education
S2: Father's occupation
S3: Father's education
S4: Household acquisition index
S5: Relative parental income
S6: Parental neighborhood status
Apt: Academic aptitude
Peer: Peer plans index
Stand 1: Sophomore quartile class standing
Teach: Discussion of college plans with teachers and counselors
Parent: Discussion of college plans with parents
Imag 1: High school academic self-concept
Edex: Educational expectations
Stand 2: High school senior quintile class standing
Con 1: Average school academic aptitude level
Con 2: Average school father's education level
Con 3: Average curriculum academic aptitude level
Con 4: Average curriculum father's education level
Select: Astin's college selectivity score
GPA: Freshman grade point average
Major: Anticipated freshman major; high performance versus other
Imag 2: College academic self-concept
Persist: College persistence
Educ 1: Overall educational attainment level
Educ 2: Educational attainments for the college-going sample
Occ 1: Early occupational attainments
Occ 2: Present occupational attainments

CHAPTER 5

DATA ANALYSIS

Analysis of our models will be rather straightforward, assuming that certain limitations in levels of measurement do not impose insurmountable barriers. Our principal analytic tool will be path analysis, which employs standardized partial regression coefficients as its basic statistic.

Path Analysis

Hauser (1970: 660-661), in concluding his critique of contextual analysis, suggests that dummy variable regression or covariance techniques are most appropriate for assessing group differences, treating groups themselves, rather than some measure of group composition, as units of analysis. This strategy, he suggests, should serve both to maximize structural and group effects while avoiding the reification of artifact. It would seem, however, that the ad hoc promotion of explanations for "explained" between-group variance is a more circuitous path to our ultimate goal of understanding social processes than is the analysis of theoretically relevant organizational features (including contextual ones) which are ultimately responsible for these between-group differences. The fact that any one factor, contextual variable or otherwise, does not account for all of this variance is not surprising and offers no compelling argument for the discontinuation of attempts to develop causal models to explain these phenomena. The strategies that Hauser recommends are quite appropriate techniques for the analysis of group differences, but they are equally appropriate to contextual analysis. In contextual analysis, however, it is often impossible to assume the independence of a covariate from the treatment group (as in the non-independence of status context and individual status), as is required in the ANCOVA model. For this reason, it is perhaps best to work with regression techniques that allow for the systematic interrelations of independent variables (Werts and Linn, 1971).

Thus, we shall employ path analytic techniques in the assessment of the causal models in both the preliminary and contextual analyses. Land (1969), Heise (1969), and Duncan (1966) provide concise summaries of path analysis assumptions, principles, and techniques.

Land summarizes the essential logic and assumptions of the technique as follows (1969: 5-6):

> . . . the method of path analysis applies only to sets of relationships among variables which are linear, additive, and causal. Furthermore, the variables are assumed to be measurable on an interval scale . . . . In such systems of relationships, a subset of variables is taken as linearly dependent on the remaining variables, which are assumed to be predetermined . . . (that is) caused by variables outside the set under consideration . . . the total variation of the endogenous (dependent) variable(s) is assumed to be completely determined by some linear combination of variables in the system.

Thus, path analysis is technically restricted to deterministic, linear, additive causal models. Each dependent variable is assumed to be an exact function of the independent variables in the system, including an unmeasured residual variable to account for the variance left unexplained by the other measured independent variables. The convention of employing path models to summarize one's hypothesized causal relations compels the researcher to make these causal assumptions explicit.

The path coefficient, the principal statistic employed in path analysis, is equivalent to a standardized partial regression coefficient when working with measured variables in recursive models:

$$P_{ij} = \frac{\sigma_j}{\sigma_i} (C_{ij})$$

Where: P_{ij} is the path coefficient, with

j the subscript for the independent variable;

σ_j is the standard deviation of the independent variable;

σ_i is the standard deviation of the dependent variable;

C_{ij} is the partial regression coefficient, with j the independent variable.

Although the path coefficient measures the direct effect of a given independent variable on a dependent variable, its indirect effect is easily computed, being simply the difference between the zero-order correlation coefficient for the two variables and the path coefficient.

Path analysis techniques provide a powerful tool for assessing causal models, but their restriction to interval levels of measurement is a severe restriction on the generality of their utility. As Land

(1969: 33) indicates, this requirement might be cautiously relaxed in employing "partially interval" measures (somewhere between ordinal and interval) in path models. More recently, others have indicated that a somewhat less cautious attitude in assuming intervalness might not introduce too great distortion to our results (Boyle, 1970; Lyons and Carter, 1971; Lyons, 1971).

Building on demonstrations such as Labovitz's (1967) that the application of intervally based statistics to a set of ordinal data under a wide range of scoring systems results in only minor differences in measures or association and tests of significance, these authors advocate the pragmatic application of path analysis procedures to ordinal data. Wilson (1971), however, has cautioned against the indiscriminate use of such applications. He bases his argument primarily upon the essential arbitrariness of any numerical coding scheme for ordinal data and the fact that certain nonlinear transformations can dramatically alter the results of analysis. Thus, if results are dependent upon the specific coding scheme applied, such analyses are always subject to the unrejectable alternate hypothesis of measurement error and cannot constitute conclusive evidence. Wilson does conclude, however, that given the present crude state of the arts regarding levels of measurement, the application of interval techniques to ordinal data does have heuristic utility, so long as no claims to having "rigorously" tested or confirmed hypotheses are forthcoming from such analyses.

Wilson's arguments are formal and mathematical. The demonstration that rather complex transformations of ordinal data can alter the conclusion to be derived from analysis does imply that we can never reject with certainty the measurement error explanation, but, empirically, the practical risks seem to be rather modest.

To quote Lyons (1971: 168), "The single justification of any scientific methodology is its pragmatic utility." To date our more powerful tools of analysis have seen only limited application because of their restriction to interval scale measures. The few studies exploring the consequences of assuming equal intervals for ordinal measures in path analysis indicate the feasibility of this strategy (Boyle, 1970; Lyons and Carter, 1971; Lyons, 1971).

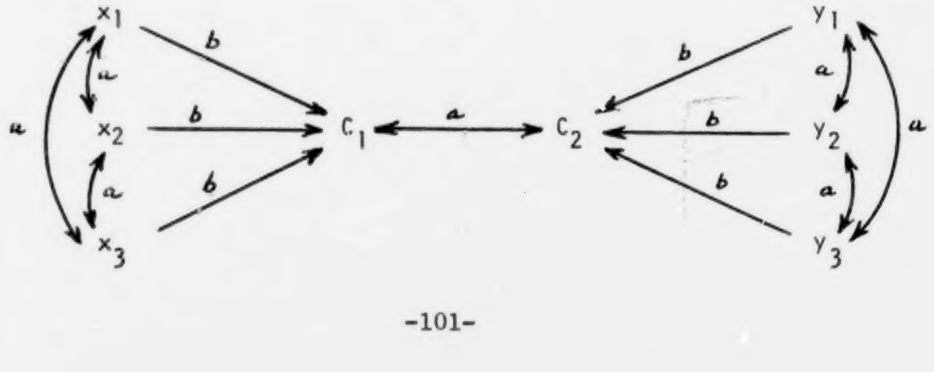
It should be noted that although the implications of assumed equal-intervalness in path models has only recently become the object of study and debate, these assumptions have implicitly been made for some time, apparently without reservation, in a number of empirical analyses of attainment processes. A number of the measures in Sewell's models (Sewell, Haller, and Portes, 1969; Sewell, Haller, and Ohlendorf, 1970) and Spaeth's (1968; 1970) are, at best, contrived metrics. This is certainly the case for Spaeth's measures of respondent's grade point average (1968: 551) and higher degrees earned (1970: 634), and is probably also true for the rest of the variables in his models, given his recoding and index construction procedures. Similarly, Sewell's measures of the "influence of significant others" and occupational status (1969: 86-87) would seem to be ordinal scales.

Canonical Analysis and Sheaf Coefficients

In addition to employing the standard techniques of path analysis, we will utilize Heise's sheaf coefficient (in press) and a canonical analysis to provide a summary indicator of the combined gross effects of our family background status variables on subsequent dependent variables. Although our analysis will still explore the differential consequences of the various dimensions of background status that we have described in our measurement section, sheaf coefficients and canonical variates will provide summary measures of the total "status" influence on dependent variables. Thus, these coefficients will permit us to discuss the composite effects of a general social construct. In effect, the explanatory power of each status indicator will be mediated through an "induced" unmeasured SES variable, thereby permitting us to assess both the combined effects of all background factors through a single "social status construct" as well as the relative contribution of each indicator itself to that construct.

The canonical correlation analysis is used in our sex-controlled models in Chapter 8 and will be discussed here first. For models in which the effects to be constrained by the construct are the only exogenous variables, the procedure is rather straightforward. The canonical analysis is performed on two sets of variables consisting of those whose effects are to be mediated through the unmeasured intervening construct and all others in the model. The canonical procedure generates unmeasured variates as linear functions of their respective sets of variables such that the correlation between variates is at a maximum, under the constraint of orthogonality between pairs of variates. Thus, in contrast to the factor analysis model, which selects linear functions of sets of items that maximize variance within domains, the canonical analysis maximizes covariance between domains (Cooley and Lohnes, 1971: 169).

Assuming a model with three indicators in each set and one significant canonical correlation, the results of the canonical analysis may be presented schematically as reflecting the following causal structure:

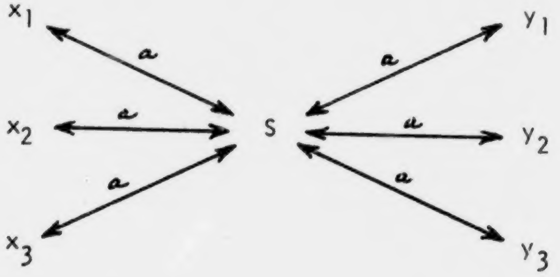


where:

C1 and C2 are canonical variates;
X's are items whose effects are to be mediated;
Y's are dependent variables in the model;
a's are simple correlation coefficients;
b's are standardized partial regression coefficients.

As is suggested in this schematic diagram, the model posits a causal structure in which the unmeasured construct is an exact function of its "cause" indicators. Furthermore, variables in one set are only related to variables in the other through the mediating mechanism of the intervening construct(s).

Since the b's in the above figure are standardized regression coefficients, applying the basic theorem of path analysis ($r'_{xy} = \Sigma b_{yx_i} r_{xx_i}$, for i = 1 to n) readily provides estimates of the simple zero-order correlations between canonical variates and each item in their respective sets. Next, the second canonical variate is absorbed into the set of dependent variables by multiplying through the canonical correlation with each r_{c2y_i}. The remaining "first" variate is the "SES Construct." These various manipulations reduce the model to the following set of estimated zero-order correlation coefficients:



Finally, the r_{xy} between-set constrained correlations are computed as the products of the appropriate correlations with the SES construct (i.e., $r_{x_iy_i} = r_{x_is} r_{y_is}$). This, then, completes the constrained correlations between sets and with the SES construct (interitem correlations among variables within sets are unaffected by the construct construction procedure). This matrix of constrained correlations is then employed as the basic data in the multiple regression analysis.

For models in which the constrained effects between sets of variables will be affected by their mutual relationship to other exogenous or causally antecedant variables, the index construction procedure is somewhat more complex than that described above (Hauser, 1972: 174-176). In our total sample model in Chapter 8, which incorporates sex as an exogenous variable, the estimation of constrained correlations between status indicator and dependent variables requires an adjustment for the covariance of status items with dependent variables that is a function of their mutual relationship with sex. While the estimation procedure remains conceptually similar, this mutual dependence (or covariance in the case with exogenous variables) must be taken into account. This is accomplished by partialling the preliminary zero-order correlation matrix on those variables whose effects must be controlled, using this matrix of partial correlations as the basic data for the canonical analysis. Of course, the coefficients then generated by the canonical analysis will be partials (or, in the case of the regression coefficients, "double partials") which must then be transformed back into estimated constrained zero-order interitem correlations. The technical aspects of this procedure are discussed in considerable detail elsewhere (Hauser, 1972), as is canonical correlation analysis itself (Cooley and Lohnes, 1972; Anderson, 1958).

As mentioned, the canonical analysis generates sets of orthogonal variates. Given the possibility of significant higher order canonical correlations, indicating linear covariance between sets of variables not subsumed under the first correlation, some standard is needed to determine when this construct construction strategy entails too great a loss of information. Statistically significant higher order canonical correlations are often of negligible importance, and correlations of .30 or less are frequently disregarded (Cooley and Lohnes, 1971). In this analysis, the canonical index construction strategy is employed only when the second canonical correlation is below .25. The reduction in dependent variable explained variance attributable to between-set covariance not subsumed under the first canonical correlation is reflected in the difference between the coefficients of determination computed from constrained and unconstrained correlation matrices. Both measures of explained variance are reported in our tables in Chapter 8.

Elsewhere in this report and for analyses in which the second canonical variate does exceed the .25 level, Heise's sheaf coefficient (1972) is used to estimate the net effects of the status background indicators on dependent variables. This simple "net" effect avoids the interpretive problems attendant upon multicollinearity among variables considered in conjunction. Also, in ignoring considerations of dimensionality, this construct construction strategy is able to reflect exactly the influence of the set of indicators on each dependent variable.

However, since this strategy requires that all indicators be entered into each regression equation, the model employing the sheaf coefficient is no more parsimonious than the original unconstrained model. The relationship between the sheaf and canonical techniques is suggested by the exact correspondence of their coefficients when the former is computed upon the constrained interitem correlations generated in the latter.

Since the sheaf coefficient pertains to only one dependent variable, it can reflect exactly the explanatory power of each independent variable in the x_i set. This is not necessarily true of the canonical variate which provides the best linear estimate among sets of variables.

The computational formula for the sheaf coefficient is as follows:

$$P = \sqrt{\Sigma B^2_{x_i y} + 2 \sum_{i \neq j} B_{x_i y} B_{x_j y} r_{x_i x_j}}$$

Where: B_{x_i} are the standardized partial regression coefficients (paths) for the independent variables to be summarized by the sheaf coefficient;

$r_{x_i x_j}$ are the zero order correlation coefficients between pairs of variables to be summarized by the sheaf coefficients.

The first term in the formula, then, sums the direct paths of the various independent variables in the model; whereas, the second term corrects for the indirect effects mediated through the relationship of the variables with one another. The sheaf coefficient represents the maximal linear effect of a set of indicators on a given dependent variable. The value of the sheaf coefficient is analogous to the dependent variable variance explained by the set of individual variables. The contribution of each individual indicator to the generated construct can be readily determined by the following formula:

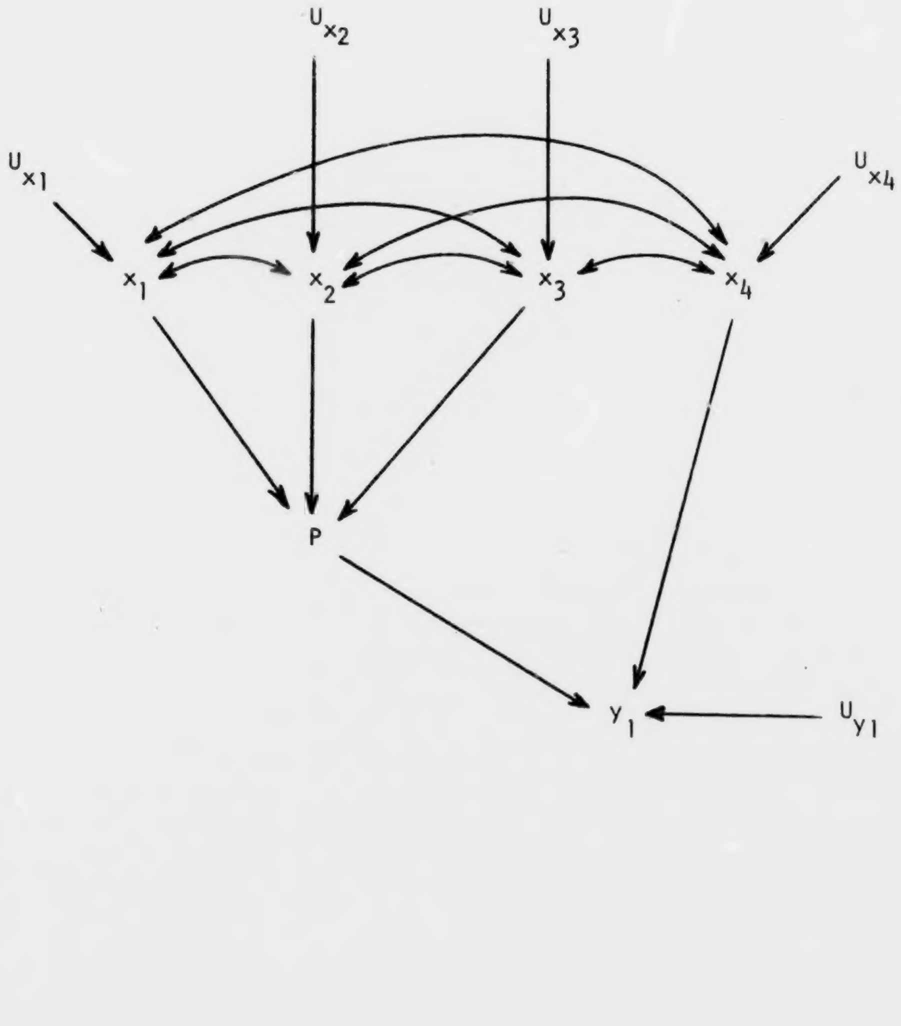
$$a_i = \frac{B_i}{P}$$

Where: B_i is the original independent variable-dependent variable path;

P is the computed sheaf coefficient for the set of independent variables.

Since a_i is directional and operates according to the principles of path analysis, the effect of a given independent variable on a dependent variable through its sheaf coefficient is merely the product $(a_{iP} \cdot P_y)$.

Thus, in using these qualities of the sheaf coefficient and again the standard rules of path analysis, we will be able to discuss the gross effects of the composite social status construct and the contribution of each status indicator to the summary construct. The following is a diagramatic presentation of a causal model involving one dependent variable, a sheaf coefficient which summarizes the effects of three antecedent indicators, and one other independent variable (x_4). Each variable except the induced variable (P) has an error term (U_i):



As the model implies, all of the effects of x_1 through x_3 on y_1 are mediated through P, and P is an exact function of the independent variables whose effects it summarizes. In more complex causal models, a new sheaf coefficient would have to be portrayed for each dependent variable which is hypothesized to be directly affected by the set x_1 to x_3. Both the sheaf coefficient and canonical variates posit a conceptual framework in which a set of causal indicators are thought to operate through some global construct which mediates their influence.

This conceptualization can be contrasted with the factor analysis model which assumes that the underlying factor or dimension is the "cause" of the empirically observed effect indicators. When conceptualizing a "social status" construct, it seems more appropriate to conceive of the various influences of parental education, occupation, economic standing, etc. as operating through some global "social status" construct, rather than to assume that "social status" somehow "causes" these various status indicators. Given our assumptions regarding the ultimate causal priority of the status indicators themselves, the conceptual model underlying the sheaf coefficient and canonical analysis suits our purposes quite well.

CHAPTER 6

GENERAL STATUS ATTAINMENT PROCESSES

We will begin our analysis of general attainment processes by evaluating the gross effects of selected background characteristics on subsequent educational and occupational attainments. The Blau and Duncan basic model of "the process of stratification" (pp. 163-194), based on their 1962 current population survey sample, has become a reference point for subsequent analyses of attainment processes, and a comparison of our data with theirs seems an appropriate and informative starting point.

Blau and Duncan: The Basic Model

Tables 6.1 and 6.2 present the inter-item zero-order correlations and path coefficients respectively from Blau and Duncan's analysis of the structural dynamics of the stratification process. The correlation matrices pertain to their total sample of males (ages 25 through 64) and to their cohort of non-farm males ages 25 through 34. The first set of path coefficients in Table 6.2 includes all estimates of effect. The second set presents the recomputed coefficients when "trivial" paths are deleted. As can be seen from the table entries, the direct paths from father's education and father's occupation to present occupation, and from father's occupation to first occupation were deleted in the reduced model. The third set of coefficients, that for the 25-34 age cohort, also excludes non-trivial paths.

The dominant patterns of influences for all three models in Table 6.2 are quite consistent. In each instance, status background variables (as measured by father's occupation and education) have only modest to negligible direct effects on present occupational status. On the other hand, background influences on educational attainments are substantial and these reflect sizeable indirect consequences for occupational outcomes. The direct educational attainment-occupational attainments linkages are the largest in each model. Thus, the attainment process is, in large measure, a step-wise progression, with status background variables affecting occupational attainments mainly through the intervening mechanism of educational certification. As might be anticipated, particular background influences are strongest in their own domain. The unmediated effect of father's occupation on son's occupation exceeds that for father's education; while the importance of the two-background variables is reversed with regard to educational attainments. Finally, years of education is a more important direct determinant of present occupational status than is early occupational attainments. This implies some considerable degree of occupational sorting contingent upon either

Table 6.1

Zero-Order Correlation Matrices for the Blau and Duncan
Total Sample and 25-34 Age Cohort Models of the
Basic Attainment Process*

	Father's Educ.	Father's Occ.	Educ. Attain.	First Occ.	Present Occ.
Father's Educ.		.516	.453	.332	.322
Father's Occ.	.488		.438	.417	.405
Educ. Attain.	.416	.411		.538	.596
First Occ.	---**	.380	.574		.541
Present Occ.	.350	.366	.657	.584	

Source: Blau and Duncan, 1967: 169, 178.

*Total Sample correlations appear above the diagonal; 25-34 age cohort correlations appear below the diagonal.

**Not computed in the Blau and Duncan analysis.

educational certification or academic competence, or both, that is not totally bound by an early occupational "anchoring" effect.

While the analyses for the total male sample and the 25-34 age cohort of non-farm males are quite similar, certain variations merit note: for the youngest cohort the direct status background influences on both educational and occupational attainments are somewhat smaller (least so for the father's occupational-educational attainment linkage); and, the paths from educational attainments to both first and present occupational attainments are somewhat larger for the subsample of young adults. Although, at least with respect to present occupation differences in length of exposure to sorting and selecting influences inhibit the attribution of substantive importance to such between-cohort differences, these data suggest that educational certification has become increasingly important in affecting occupational attainments (Blau and Duncan, 1967: 180).

Having set forth this summary of the Blau and Duncan analysis, we can now proceed to a comparison with our own results. Before doing so, however, certain variable measurement differences between the two studies derserve note. Blau and Duncan employed a 10 category educational attainment item which corresponds quite closely to our nine category measure; however, our sample is restricted to those with at least some high school education, so that the range of educational attainments in the Blau and Duncan sample exceeds ours. Furthermore, Blau and Duncan employed SEI scores (Reiss, 1961) for all occupational status measures. The SEI has a potential range of from 1 to 96, providing for considerable more item variation than

Table 6.2

Total Sample and 25-34 Age Cohort Blau and Duncan "Basic Model" Standardized Partial Regression Coefficients

	Total Sample Full Model			Total Sample Reduced Model			24-35 Age Cohort Reduced Model		
	Educ. Attain.	First Occ.	Present Occ.	Educ. Attain.	First Occ.	Present Occ.	Educ. Attain.	First Occ.	Present Occ.
Father's Occ.	.279	.214	.120	.279	.224	.115	.273	.174	.065
Father's Educ.	.310	.026	-.014	.310			.283		
Educ. Attain.		.433	.397		.440	.394		.503	.462
First Occ.			.282			.281			.294
Coefficient of determination	.26	.33	.43	.26	.33	.43	.23	.36	.50

Source: Blau and Duncan, 1967: 174, 181.

does our six category scheme. The matter of item variance is of particular importance in attempting comparisons between path coefficients across models and samples. The path coefficient is a partial standardized regression coefficient. The variance standardization facilitates comparison within models (i.e., a one standard deviation change in variation x is associated with so much of a standard deviation change in variable y), but the values for particular paths are item variance specific. Hence, if item variances differ between samples, the direct comparisons of specific path values can be misleading. Nevertheless, the relative importance of variables within models can be compared across models, even if item variances do differ. In making such comparisons, it must be recalled that a standard deviation change in one model is not necessarily the same as a standard deviation change in the other. With this caveat in mind, path analysis is a useful strategy for comparing patterns of influence across populations and studies (Duncan, 1966a).

The interitem correlations and path coefficients corresponding to those from the Blau and Duncan models are presented in Tables 6.3 and 6.4. The criteria for retaining paths in the reduced model were twofold: the F score associated with the particular Beta had to be significant at least at the .05 level; and, the Beta had to be .10 or greater. The purpose of the second criterion is to restrict our reduced models to variables of some substantive interest as well as of statistical significance.

While the correlations matrices themselves afford some interesting comparisons, we will move directly to the path analyses and statistics in Table 6.4. A first point of interest is the relative explanatory power of the various models. The Blau and Duncan reduced model for their youngest cohort explains more educational attainment variance (23 vs. 18 percent), while our reduced model accounts for somewhat more occupational attainment variance (50 vs. 57 percent for present occupation).

Despite these "discrepancies" in explanatory power, the dominant patterns of influence in both analyses agree: the direct effect of father's status variables on occupational attainments are minimal; most background effects are mediated through educational attainment; and finally, educational level has a larger direct effect on present occupation than it has on first occupation, as well as having sizable indirect influence on present status through early status levels.

The major difference between the two analyses, as reflected in the above mentioned differences in proportions of explained variance, involves the mediating role of education. In our analysis, level of educational attainment is less dependent upon the father's status items and more important in relation to occupational outcomes. Interestingly, the Blau and Duncan 25-34 age cohort analysis shows similar tendencies in comparison with their total sample. That is, for the youngest cohort the direct effects of the father background items are somewhat less and the explanatory power of the educational attainment variable somewhat greater than in the total sample,

Table 6.3

Interitem Correlations* for Replication and Extensions of the Blau and Duncan Basic Model, N=823

	Mother's Educ.	Acquis. Index	Father's Educ.	Father's Occ.	Academic Apt.	Educ. Exp.	Educ. Attain.	First Occ.	Present Occ.	SES**
Mother's Educ		.422	.540	.372	.213	.282	.277	.241	.256	.649
Acquis. Index	.422		.469	.456	.297	.354	.354	.307	.327	.798
Father's Educ.	.540	.469		.586	.345	.353	.363	.314	.332	.766
Father's Occ.	.372	.456	.586		.312	.374	.374	.325	.345	.844
Academic Apt.	.213	.297	.345	.312		.356	.489	.407	.424	.377
Educ. Exp.	.305	.358	.361	.357	.352		.492	.375	.407	.445
Educ. Attain.	.257	.345	.373	.386	.489	.492		.670	.731	.446
First Occ.	.193	.340	.284	.329	.407	.375	.670		.625	.387
Present Occ.	.258	.298	.328	.371	.424	.407	.731	.625		.411
Mean	3.535	.036	3.282	2.595	7.515	1.924	5.303	2.611	3.473	3.473
S.D.	1.352	.890	1.718	1.368	3.894	.840	1.626	1.594	1.530	1.530

*Constrained Correlations appear above the diagonal.

**Following Hauser, 1972, the SES construct has been assigned the mean and standard deviation of the present occupational status variable.

Table 6.4

Standardized Partial Regression Coefficients
for the Blau and Duncan "Basic Model"
EEO Replication, N = 823

	Full Model			Reduced Model		
	Educ. Attain.	First Occ.	Present Occ.	Educ. Attain.	First Occ.	Present Occ.
Fath. Occ.	.253	.084	.075	.253		
Fath. Educ.	.221	-.006	.018	.221		
Educ. Attain.		.638	.536		.667	.565
First Occ.			.236			.247
Coefficient of Determination	.178	.451	.572	.178	.446	.566

although still not obtaining the level of influence found in our survey.

Of course, before attributing substantive importance to these discrepancies, the possibility that they reflect a methodological artifact must be considered. In this respect, differences in the measurement of occupational status are an obvious source of concern. While this concern cannot be completely allayed, indirect evidence suggests that measurement differences are not likely to account for all the differences between the Duncan-Blau and EFD analyses.

First, it can be noted that our occupational status correlations with other variables are not consistently either inflated or attenuated in comparison with the corresponding correlations from the Blau and Duncan sample. As is reflected in the differences between path analyses, our intragenerational correlations are consistently larger, while intergenerational ones are all somewhat reduced. A straightforward explanation in terms of measurement differences would not account for this pattern of intragenerational crystallization and intergenerational attenuation.

Furthermore, a comparison of our data with comparable information from Sewell's study of Wisconsin high school seniors supports this interpretation. While Sewell's Father's Occupation-Father's Education correlation at .494 (Hauser, 1972) is somewhat lower than Blau and Duncan's, in the Wisconsin sample the Son's Education-Son's Occupation correlation is .618 (Sewell, Haller, and Ohlendorf, 1970), which is almost midway between our value and Blau and Duncan's. Perhaps of even greater interest, regressing educational attainments on father's education and father's occupation for the Wisconsin sample yields path coefficients of .221 and .217 and a coefficient of determination of .143 (computed from correlations presented in Hauser, 1972). These figures are quite comparable to those obtained for our sample, at .221, .253, and .178 respectively.

It will be recalled that Sewell's sample is quite similar to ours in terms of age composition and time at which sampled (1955 vs. 1957). Since Sewell's analysis employed SEI measures of occupational status throughout, this cross-validation suggests that measurement differences probably do not account for the discrepancies between ours and the Blau and Duncan findings.

On the other hand, a not too unreasonable substantive interpretation would subsume practically all of those differences. It would involve an extension of Blau and Duncan's speculative suggestion (1967: 180) that their between-cohort differences might reflect the increasing importance of educational certification for occupational achievement. While their conclusions concerning intergenerational differences were tempered by the confounding of length of exposure to "sorting and selecting" influences with regard to present occupation, our comparison with their youngest cohort controls for such exposure.

By far, most of the youth in our sample were 30 to 32 years of age in 1970. Consequently, the point of measurement of present occupational attainments of the Blau and Duncan 25-34 age cohort in 1962 is quite comparable to ours with respect to age, but eight to ten years earlier in time. Hence, differences between these two samples, assuming that they are not methodologically explicable, can readily be attributed to actual changes over time in attainment dynamics.

The differences could reflect the continuing dissociation of educational attainments from family status determination and the still increasing importance of educational attainments for subsequent occupational sorting. Although the considerable sample, item, and methodological differences separating the Blau and Duncan study and ours certainly preclude the unqualified acceptance of a substantive interpretation of this kind, the similarities between the two analyses are impressive and the differences are at least consistent with the trends suggested in the Blau and Duncan analysis itself, as well as with the somewhat comparable data from Sewell's sample. If valid, the implications are far-reaching. Not only is the attainment value of educational certification increasing, but it has come to subsume practically all the status background consequences for subsequent occupational sorting. Under such circumstances, issues of "equality of educational opportunity" loom even larger. The influence of different school setting must not be dismissed, despite negative conclusions regarding school effects as such (Coleman, et. al., 1966; Jencks, 1972; Hauser, 1969), until we have fully explored such effects, the importance of interpersonal processes within school settings (Sewell, Haller, and Ohlendorf, 1970; Sewell, Haller, and

Portes, 1969), and the interactions between background traits and within-school processes. Our analytical models are still too crude and the issues too important not to persist with efforts to increase our understanding of these dynamics.

The extensions of the model which follow represent a modest increment in complexity in the assessment of attainment dynamics, and the concluding "education-controlled" models will suggest that the more general structural model may exaggerate somewhat the importance of educational certification as a mediator of background influences.

Elaborations: Academic Aptitude and Multiple Status Indicators

Taking this comparison as a starting point, we can readily begin to elaborate our model in directions that were not feasible for Blau and Duncan. It will be recalled, as mentioned in our introductory chapter, that Blau and Duncan's reliance upon the Current Population Survey sample compelled them to restrict their attention to a rather narrow range of variables. In particular, they were not able to gather data on a variety of subjective-attitudinal variables or on academic aptitude, all of which have been shown in a considerable body of earlier and subsequent research to specify the dynamics of the basic model just portrayed. The most immediate elaboration of this basic model would include a measure of academic aptitude as an exogenous variable in a position parallel to the background status items. Table 6.5 presents the inter-item correlations for the variables in the path model presented in Table 6.6, as well as for our measure of educational expectations, which will be introduced shortly. As was noted in Chapter 2, a major issue in the status attainment literature has been the assessment of the relative importance of aptitude and status background influences on subsequent attainments. The model in Table 6.6 will permit us to explore this question. All six of our family background status indicators are now included in our models, as well as the sheaf coefficient which mediates their influence.

A comparison of the multiple R^2's in this model with those presented in Table 6.4 indicates that the **addition** of the aptitude item and the four background variables increases our explanatory power for each of our dependent variables only modestly. The largest increase occurs for the educational attainment variable, with the explained variance rising from 16 to 32 percent. As in our earlier model, the most important explanatory variable for the occupational attainment variables is the years of education item. The direct educational paths (.525 and .580) far exceed any other direct paths into these variables. The direct effects for our measure of academic aptitude fall below our criteria for retention for both of these variables and these paths have been deleted from the reduced model. It should be noted, though, that the indirect effect of aptitude through educational attainments is appreciable, being .213 for early occupational

TABLE 6.5

INTER-ITEM CORRELATION MATRIX FOR EXTENDED BASIC MODEL WITH SIX STATUS INDICATORS, ACADEMIC APTITUDE, AND EDUCATIONAL EXPECTATIONS INCLUDED*

	S2	S3	S4	S5	S6	Apt.	Ed. Exp.	Educ. 1	Occ. 1	Occ. 2
S1	.558	.382	.424	.266	.318	.211	.314	.268	.207	.271
S2		.592	.495	.395	.384	.312	.360	.383	.335	.372
S3			.480	.333	.388	.354	.364	.376	.290	.334
S4				.396	.439	.294	.368	.342	.337	.297
S5					.455	.182	.258	.180	.154	.149
S6						.169	.244	.209	.200	.244
Apt.							.355	.483	.406	.421
Ed. Exp.								.494	.377	.407
Educ. 1									.667	.734
Occ. 1										.626

*It will be recalled that the status indicator labels correspond to the following variables: S1, Mother's Education; S2, Father's Occupation; S3, Father's Education; S4, Acquisition Index; S5, Relative Parental Income; S6, Parental Neighborhood Status.

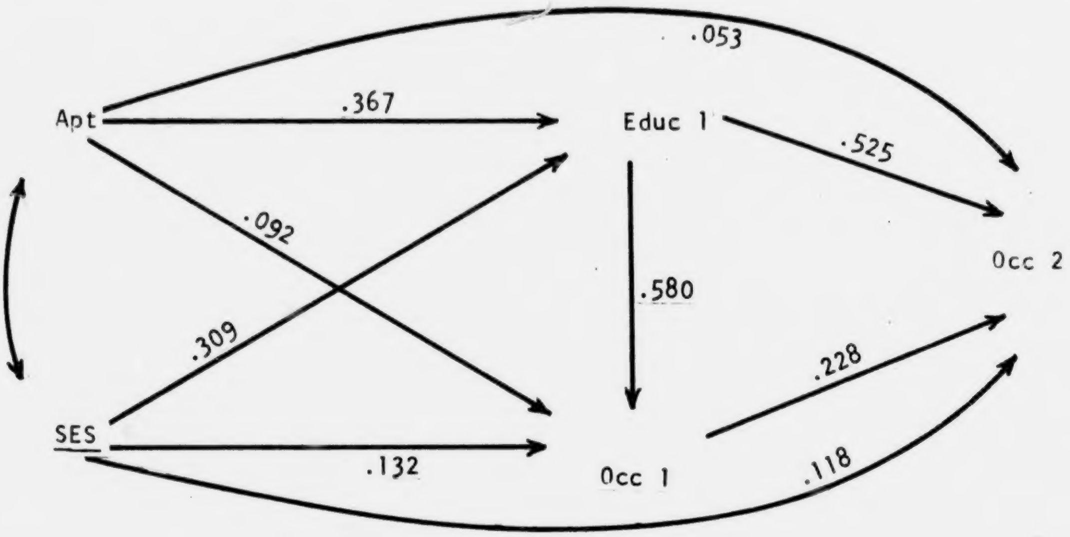
attainments and .193 for present occupation. Furthermore, the two stage aptitude indirect effect through the education-early occupation path would be .048. The combination of these modest influences with the more significant mediated effects, indicates the importance, be it largely indirect, of academic aptitude for subsequent occupational attainments. These results tend to support the mediation hypothesis developed in Chapter 3. Although the direct effect of aptitude level on occupational attainments is modest, it demonstrates sizable indirect influence through affecting educational attainments.

The effects of the various status indicators through the sheaf coefficient also merit some attention. Our inclusion of all six status indicators is, in large measure, "exploratory." A number of studies exploring the processes we are investigating have obtained markedly different effects for social status indicators, different in terms of their absolute influence and their influence relative to that of aptitude indices. Perhaps our examination of these multiple indicators will enable us to suggest some partial resolution to these contradictory findings. Although we have no firm expectations regarding their relative importance, the educational level and occupational status items are most firmly

TABLE 6.6

FULL AND REDUCED PATH COEFFICIENTS FOR BASIC MODEL, WITH ACADEMIC APTITUDE, SIX STATUS INDICATORS, AND THE SHEAF COEFFICIENT*

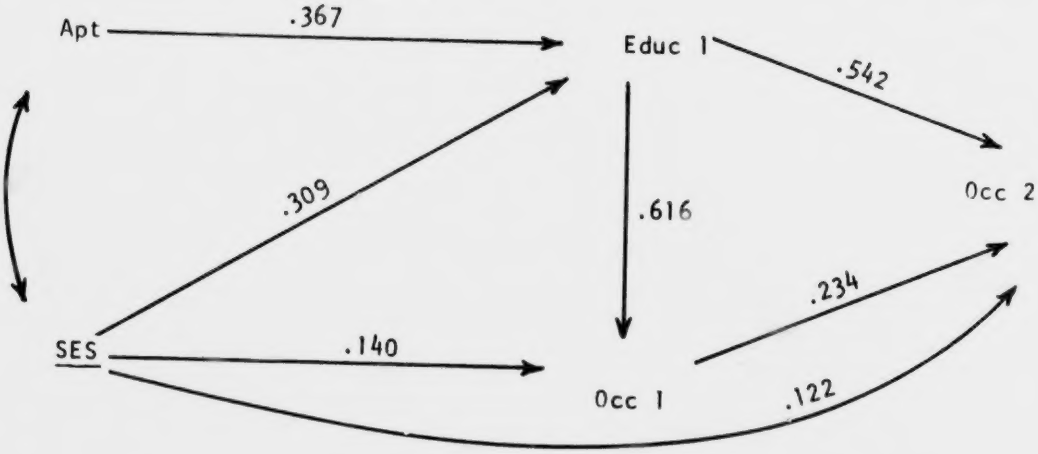
Full Model


Apt
SES
Educ 1
Occ 1
Occ 2
.053
.367
.525
.092
.580
.309
.228
.132
.118

"A" Coefficient For	Educ 1	Occ 1	Occ 2
S1	.136	-.121	.509
S2	.534	.531	.639
S3	.262	-.334	-.187
S4	.369	.835	-.339
S5	-.123	-.220	-.416
S6	.019	.220	.679

Multiple R^2's: Educ 1, .316; Occ 1, .469; Occ 2, .588

Reduced Model



"A" Coefficient For	Educ 1	Occ 1	Occ 2
S1	.136	-.136	.473
S2	.534	.506	.628
S3	.262	-.207	-.106
S4	.369	.835	-.302
S5	-.123	-.185	-.384
S6	.019	.150	.645

Multiple R^2's: Educ 1, .316; Occ 1, .462; Occ 2, .588

---

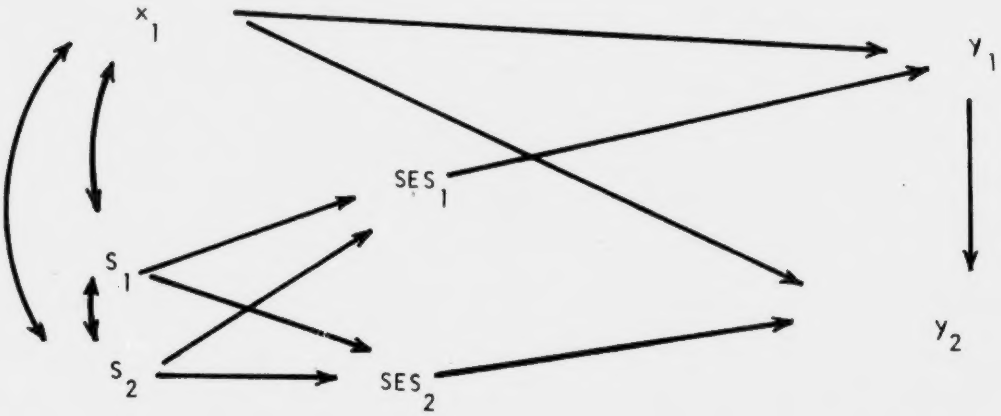
*Inter-item correlations for exogenous variables included in Table 6.5. In these models, as in all others that follow, the induced SES variable is related to all other exogenous variables with a double-headed arrow. This has been done to emphasize SES's treatment as an exogenous variable in these models. If our full model were displayed diagramatically, the six status indicators would be causally antecedent

(Table 6.6 continued)

---

to the construct, and all other exogenous variables would be related to each of the six status indicators by double-headed arrows, as would the indicators themselves with one-another. Actually, the other exogenous variables are only related to the construct through the six indicators. The presentation of all such arrows, however, would be quite unmanageable. We have adopted this construct-exogenous variable linkage as a convention to avoid the more cumbersome portrayal of a multitude of double-headed arrows. It will be recalled that the A coefficient for each item represents its contribution to the composite index. Thus, the A coefficient is comparable to a Beta in relation to the construct as a dependent variable. Direct status item paths to other dependent variables are readily computed as the (A·Sheaf) product. The large value of many A coefficients should not be misconstrued to necessarily imply importance in the determination of later dependent variables in the model. Large A values only imply that those items are the major determinants of that particular construct. If the sheaf itself, in turn, is negligible, then the antecedent items are also inconsequential, despite the magnitude of the A coefficients. In this table, as in all that follow, "SES" is used to designate the composite effect of our six status background indicators through the sheaf coefficient.

Finally, we have underlined the induced SES construct in this and all following tables to remind the reader that we have actually constructed an unique SES variable for each dependent variable in the analysis. Consequently, the computation of indirect SES effects as the product of paths included in the tables would provide only approximate results. A full representation of the actual path model for our induced SES construct (restricted to two status indicators for the sake of simplicity), one other exogenous variable, and two dependent variables would have to be portrayed as follows:



As now becomes evident, the indirect effects of SES_1 on y_2 would have to be computed through SES_2. We have adopted the mode of presentation in Table 6.6 to avoid unnecessary cluttering of our tables with a multitude of arrows, but the reader should keep in mind the actual model which underlies this format of presentation.

grounded in social stratification research and theory. Of the other three, the relative income, neighborhood status, and Acquisition Index variables, to our knowledge only the last has been employed in previous research on the educational attainment process. Cramer, Bowerman, and Campbell (1966) found their Material Possessions Index, conceptually similar to our Acquisition Index, to be strongly related to educational plans. Given our exploratory interest in this set of status variables they will be treated as a unit, deleted from the reduced models only when the gross effect of all six falls below our cut-off level.

The first appearance of these status variables in Table 6.6 offers some unanticipated results. It will be noticed that their gross direct explanatory power in relation to the two occupational attainment variables is quite modest, with the sheaf coefficients being .132 and .118 for the first and present status indicators respectively. An inspection of the individual paths into the sheafs reveals that in both cases three of the individual status items actually depress occupational attainments (keep in mind that these A coefficients are equivalent to Batas, and, hence, are partial measures, computed with the effects of all other variables controlled). The indirect effects of the sheaf coefficient through educational attainments, on the other hand, would be positive and sizable, at least in comparison with the direct effects. Thus, again, we find considerable support for the mediation hypothesis.

The (A_{x_i}.Sheaf) product reproduces the original item-dependent variable path. Hence, the A's may be compared directly to assess both relative item contributions to the gross sheaf coefficient, and, in turn, the direct influence of an indicator on a dependent variable. With these properties of the sheaf and A coefficients in mind, it is interesting to note that the effect of the status indicators as a set, though positive, is extremely modest. Apparently much of the positive influence of some commonly employed status indicators (father's occupation, mother's education) is somewhat offset by the countervailing negative influences of other such indicators. The minimal positive effect of father's education on occupational attainments noted in Table 6.4 is actually attributable to the other background variables which have now been introduced into the model. With the entire set of six included, these direct father's education paths are now -.022 (-.187 x .118) and -.044 (-.334 x .132) respectively for first and present occupational attainments (figures cited are A. Sheaf products, as are the "B's" which follow). As the A coefficients indicate, the single most positive status influence on present occupation in the Table 6.6 Full Model is the neighborhood status variable (AS6: .679; B: .088); while for first occupation it is the Acquisition Index, which accounts for more than half of the modest positive status effect (AS4: .835; B: .110).

The inclusion of this entire set of six status indicators has already produced quite interesting, and somewhat serendipitous, results for consideration. Although a cogent substantive interpretation is not immediately forthcoming, our data indicate inconsistent and somewhat offsetting effects for the particular items in our set of six status indicators. If we treat these six items as a "set," in the sense that collectively they may be taken to reflect the influence of a "social status construct," then the net direct positive social status effect is obviously more modest than that which might be implied by the more commonly employed individual status indicators and the generalization of the "positive effect" hypothesis to all SES indicators under all circumstances. Thus, the direct fathers education and occupation paths on present occupational attainments in our first replication of the Blau and Duncan model were .052 and .068 respectively, and these items would have produced a sheaf of .107: whereas, the reduced form sheaf coefficient in Table 6.6 is but .122, reflecting an only modest increase in the explanatory power for the set of six indicators. Furthermore, as the A coefficients indicate, a number of the individual items actually have modest depressant consequences for occupational attainments. Thus, the addition of multiple status indicators does not increase the positive explanatory power of the composite status construct in a simple, additive fashion, as might have been hypothesized. Rather, the actual influence of the status indicators appears more complex than would be anticipated under a straightforward "positive effect" hypothesis. We will continue to explore the relative influence of these various status indicators, as well as their joint gross and net effects, throughout the remainder of our analysis. Given the minimal value of these sheafs, and the self-cancelling status item effects they subsume, the "net positive" direct status influences on these occupational attainment variables can be considered modest, at best.

The remaining dependent variable in the models included in Table 6.6 is the educational attainments item. Both the academic aptitude and the set of six background status indicators have moderately large direct paths to the educational attainment variable. The aptitude influence is somewhat the larger of the two, with its path being .367 while the status sheaf coefficient is .309. Only one of the status item paths into the sheaf is negative, that for the relative family income item, and it is quite modest. This A coefficient is -.123, which is equivalent to a direct income-educational attainment Beta of -.038. Consequently, our data indicate the importance of both status background and academic aptitude in influencing educational attainments, with the aptitude effects being the larger of the two. The difference in the relative contribution of the two variables is, however, not substantial.

The reduced form path coefficients for this set of variables are also included in Table 6.6. It will be recalled that the criteria for retaining a path in the reduced model are twofold: significance at the .05 level; and, a coefficient of at least .10. A comparison of the total and reduced form paths reveals no dramatic differences. The variance explained for each dependent variable remain essentially unchanged. Consequently, the remaining paths are somewhat increased, having picked up the deleted effects. As the direct path values indicate, no single remaining effect has increased exclusively. Rather, the modest deleted influences seem to be distributed rather evenly over the variables remaining in the model.

Elaborations: Educational Expectations

Table 6.7 presents a rather straightforward elaboration of the basic models already discussed. This extension of the model involves the inclusion of an intervening "educational expectation" variable to mediate the influence of aptitude and status variables on subsequent attainments. This is the first of our more subjective-interpersonal variables to be incorporated into our attainment models. In following chapters we will further elaborate these models to explore more interpersonal influences within particular educational settings. As was indicated in our introductory chapter, goal orientations have received extensive attention in the previous attainment literature and it is felt appropriate to introduce this variable at this point in our exploration of what might be termed the "basic attainment process" models. The inter-item correlations for the models presented in Table 6.7 are included in Table 6.5.

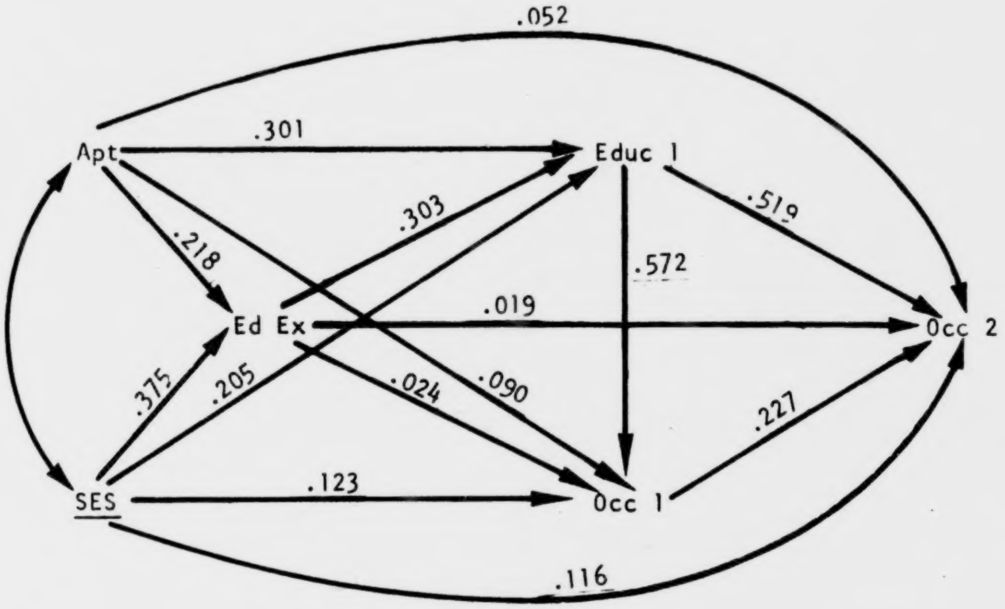
Looking first at the educational expectation item as a dependent variable, both the aptitude test and the set of status indicators are noted to have considerable explanatory power. The status sheaf path is .375, as compared to a direct path of .218 for academic aptitude. Thus, family background influences are almost double those for academic aptitude in relation to the setting of educational goals. In addition, the A coefficients for the eduational expectations item are all positive, indicating that each individual status background indicator is positively related to the goal orientation variable. An inspection of these particular A's reveals that the bulk of this status influence is attributable to the household acquisition index, father's occupation, and father's education, in that order of magnitude. Indeed, the A coefficients of .386 for the acquisition index (B: .145) and the .317 for father's occupation (B: .119) reveal these items to be the dominant non-intellective determinants of educational expectations in our analysis.

These educational expectations themselves, in turn, can be seen to exert a direct effect on actual educational attainments, with a direct path of .303. As a consequence of the introduction of this goal orientation item, the direct occupational path for the aptitude index drops from .367 to .301 and the sheaf coefficient drops from .303 to .205. This, of course, implies that some of the direct influences of these variables included in Table 6.6 are actually mediated through the goal setting process. Thus, in addition to its direct influence on educational attainments of .301, the aptitude variable has an additional indirect path of .067 through educational expectations which adds, with some rounding error, to the .367 aptitude path included in Table 6.6. It might be noted that the introduction of the educational expectation variable to the model modifies somewhat the

TABLE 6.7

FULL AND REDUCED PATH COEFFICIENTS FOR EXTENDED BASIC MODEL AND EDUCATIONAL EXPECTATIONS INCLUDED*

Full Model

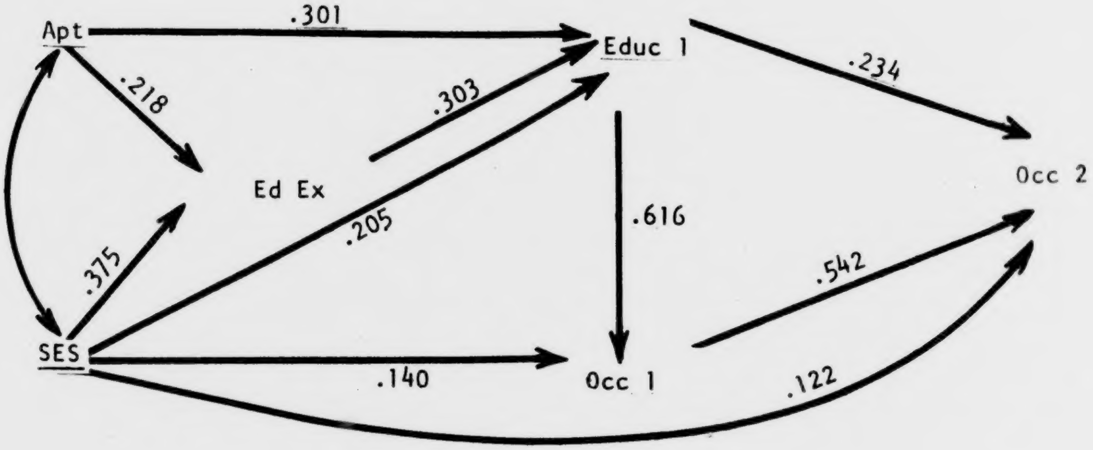

.052
.301
Apt
Educ 1
.218
.303
.519
.572
Ed Ex
.019
Occ 2
.375
.205
.024
.090
.227
SES
.123
Occ 1
.116

"A" Coefficient For	Ed Ex	Educ 1	Occ 1	Occ 2
S1	.285	.049	-.147	.502
S2	.317	.630	.538	.640
S3	.165	.303	-.367	-.190
S4	.386	.342	.872	-.364
S5	.157	-.270	-.253	-.433
S6	.035	.015	.296	.692

Multiple R^2's: Ed Ex, [illegible]; Educ 1, .384; Occ 1, .469; Occ 2, .588

(Table 6.7 continued)

Reduced Model


Apt
.301
Educ 1
.218
.303
.234
Ed Ex
Occ 2
.616
.205
.375
.542
SES
.140
Occ 1
.122

"A" Coefficient For	Ed Ex	Educ 1	Occ 1	Occ 2
S1	.285	.049	-.136	.473
S2	.317	.630	.506	.628
S3	.165	.303	-.207	-.106
S4	.386	.342	.835	-.302
S5	.157	-.270	-.185	-.384
S6	.035	.015	.150	.645

Multiple R^2's: Ed Ex., .248; Educ 1, .384; Occ 1, .462; Occ 2, .588

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*Inter-item correlations for exogenous variables included in Table 6.5.

particular A coefficients for the various status indicators. None of these changes, however, are marked. Finally, it might be noted that the educational expectations item does more than merely funnel the influences of various antecedent variables. The inclusion of this item in the model raises the multiple R^2 for educational attainments from .316 for the variables of Table 6.6 to .384, indicating some minimal unique explanatory power for the educational expectations item.

The paths from educational expectations to both first and present occupational attainments are essentially zero and are dropped from the model in its reduced form. Thus, any goal level effects on occupational attainments are mediated through its influence on educational attainments. The reduced form model, in Table 6.7, then, is unchanged from that in Table 6.6 except for the educational attainment column and the inclusion of the educational expectation variable itself. Once again, the coefficients in the reduced form path model are essentially unchanged from those in the full model.

Models with Educational Level Controlled

We shall conclude this initial analysis of the general attainment process with a brief exploration of the relative importance of aptitude and social background influences on subsequent occupational attainments at given levels of educational attainment. Our interest in this question has been spurred by Eckland's research (1965) on a 10 year follow-up sample of 1952 University of Illinois freshmen and by his proposal which led to the EEO Survey. In Eckland's study, class background effects exerted their major influence on the occupational attainments of college dropouts, while ability effects were most evident for the college graduates. Table 6.8 presents the inter-item correlation matrices for three levels of educational attainments: High school graduates (N=294); some college (N=183); college graduates (N=275). The subsample of high school dropouts (N=38) was too small to provide meaningful comparisons and, hence, no data are reported for this educational level.

It is first interesting to note variations in background status inter-item correlations by educational level in Table 6.8. Although differences are not dramatic, they are consistent. In 28 of 30 comparisons, status variables correlate most highly with one another for college graduates, next so for college dropouts, and least so for high school graduates. The sole exceptions to this pattern are the following: the father's education-mother's education and the mother's education-neighborhood status correlations for the college-dropout sample.

For the total male sample the aptitude-educational attainment correlation of .4[illegible] exceeds any of the status background-educational attainment correlations, which range from .180 for the relative income item to

.383 for father's occupation. Thus, both family background and academic aptitude are related to educational attainments, with the single item relationship being highest for academic aptitude. Our preceding analysis indicates that the aptitude and status influences on educational attainments are actually somewhat more equal than would be indicated by any single background status item.

Finally, subsample mean status item values increase consistently from high school graduate to college graduate subsamples (not included in tables). Thus, our subsamples reflect both an increase in all family status indicators and an increasing clustering of background characteristics as well with increasing levels of educational attainments. Similarly, average aptitude levels rise with increasing educational attainments. They increase from 5.90 for high school graduates, to 7.55 for college dropouts, up to 9.79 for college graduates (not included in tables).

The three education-controlled occupational status attainment models are presented in Tables 6.9 through 6.11. Before turning to the path coefficients, we might note the magnitude of the multiple correlation coefficients for the occupational attainment dependent variables in these models. As our preceding analyses indicate, in controlling for educational attainments in these models we are controlling on one of the major explanatory variables in relation to the occupational attainment measures. Consequently, our multiple R^2's drop considerably from the .588 and .469 reported for present and first occupational attainments in the total sample model. The variance explained by our models range from a low of .083 for the first occupation status of high school graduates to a high of .171 for the present occupational attainments of college graduates. These squared multiple correlations do not vary consistently with educational level, yet, in general, they do increase with increasing educational attainments.

To begin our comparison of the education-controlled models, we can note that the linkage between first and present occupational statuses is highest for the high school graduates, with a path coefficient of .338. The comparable paths for college dropouts and graduates are .210 and .297 respectively. Thus, there is some indication of greater explanatory power in the career mobility of high school graduates than of those with higher educational attainments. Keep in mind, though, that length of career history is confounded with educational attainments in these models. In general, the higher the level of education obtained, the shorter the occupational history covered by our 1970 follow-up schedule. Thus, it is possible that the high school graduate's additional years in the occupational arena would permit a greater continuity of career lines to emerge. Conversely, this correspondence can be interpreted in terms of peculiarities in occupational experiences themselves. Thus, high school graduates are somewhat more likely than others to begin their careers at lower status levels. Under such circumstances, subsequent occupational achievements may be more dependent upon earlier ones than they would be for individuals with higher levels of formal educational certification. It

TABLE 6.8

INTER-ITEM CORRELATION MATRICES FOR EDUCATIONALLY CONTROLLED BASIC ATTAINMENT MODELS, MALE SAMPLE*

High School Graduates

	S1	S2	S3	S4	S5	S6	Apt	Occ 1	Occ 2
S1		.136	.490	.299	.132	.185	.078	.025	.122
S2	.329		.286	.233	.145	.219	.053	.183	.194
S3	.468	.501		.283	.145	.254	.168	.026	.053
S4	.345	.342	.370		.213	.238	.128	.072	.051
S5	.211	.426	.228	.406		.362	.157	.022	.081
S6	.233	.320	.248	.373	.370		.107	.036	.150
Apt	.053	.148	.156	.118	.114	.025		.108	.134
Occ 1	.025	.091	.071	.225	.031	.198	.192		.371
Occ 2	.151	.198	.234	.156	.042	.232	.121	.257	

Some College

College Graduates

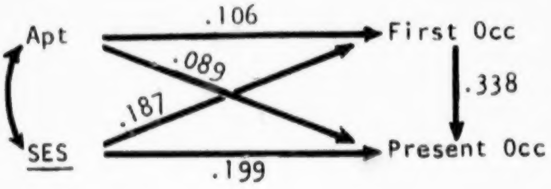
	S1	S2	S3	S4	S5	S6	Apt	Occ 1	Occ 2
S1		.415	.556	.419	.296	.341	.128	.055	.024
S2			.661	.500	.455	.393	.270	.109	.054
S3				.491	.391	.407	.277	.078	.078
S4					.435	.503	.188	.165	-.064
S5						.500	.105	.063	-.050
S6							.061	.005	-.045
Apt								.254	.264
Occ 1									.321
Occ 2									

*The high school graduate inter-item correlations appear in the upper diagonal of the first matrix. The correlations for the "some college" subsample constitute the lower diagonal.

is interesting to note that the subgroup aggregate mobility from first to present occupational statuses are, surprisingly, quite comparable across educational levels. Thus, although occupational "jumping-off" points are higher with increasing educational attainments, non-variation in career

TABLE 6.9

BASIC ATTAINMENT MODEL FOR MALE HIGH SCHOOL GRADUATES

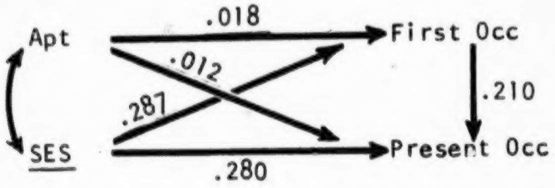

Apt
.106
First Occ
.089
.338
.187
SES
.199
Present Occ

"A" Coefficient For	First Occ	Present Occ
S1	.075	.619
S2	1.01	.604
S3	-.310	-.397
S4	.171	-.277
S5	-.721	.548
S6	-.022	.045

Multiple R^2's: First Occ, .047; Present Occ, .186

TABLE 6.10

BASIC ATTAINMENT MODEL FOR MALES WITH SOME COLLEGE EDUCATION

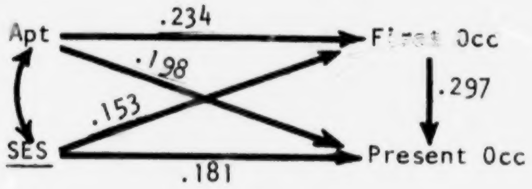

Apt
.018
First Occ
.012
.210
.287
SES
.280
Present Occ

"A" Coefficient For	First Occ	Present Occ
S1	-.258	.128
S2	.153	.318
S3	-.056	.507
S4	.801	-.018
S5	-.460	-.378
S6	.596	.578

Multiple R^2's: First Occ, .083; Present Occ, .140

TABLE 6.11

BASIC ATTAINMENT MODEL FOR MALE COLLEGE GRADUATES



"A" Coefficient For	First Occ	Present Occ
S1	0.0	.100
S2	.157	.100
S3	-.385	.487
S4	1.15	-1.07
S5	.137	-.354
S6	-.613	.111

Multiple R^2's: First Occ, .088; Present Occ, .171

transition does not seem to explain these results. The following figures present the average first and present occupational attainments by educational level for our male sample:

	High School Grads	College Dropouts	College Grads
1st Occ	1.74	2.08	4.04
Present Occ	2.42	3.28	4.88
Average Change	.68	1.20	.84

The importance of academic aptitude for occupational attainments appears to be curvilinearly related to formal educational level. Thus, for high school graduates, academic aptitude has direct paths to first and present occupational status of .106 and .089 respectively. In addition, its indirect effect on present occupation through early attainments is .036. Although these figures indicate only modest aptitude effects for high school graduates, the paths for the "some college" sample are essentially zero. Quite clearly, then, at least for our sample, academic aptitude has no effect on the subsequent occupational attainments of college dropouts. Finally, the aptitude paths for college graduates are sizable. The direct paths are .234 and .198 respectively, while the indirect effect of aptitude on present occupational status through first occupational status in .070. Thus, in accordance with Eckland's results, aptitude levels are most important in influencing the occupational attainments of college graduates. Contrary to our expectations, however, aptitude appears least important for the occupational attainments of the college dropouts, rather than the high school graduates. These results perhaps reflect the certification value of college attendance, regardless of graduation status. But the background status influences to be discussed next may offer a complementary explanation for college dropout attainment processes.

The sheaf coefficients for the first and present occupational attainments of the high school graduate subsample are .187 and .199 respectively. The most important background factors positively affecting present occupation are father's education, father's occupation, and family neighborhood status. By far the most important factor for present occupational status is father's occupation. Indeed, the 1.01 A coefficient indicates that the net effect of the remaining status variables is negative, acting to suppress on the salutory father's occupation influence.

In comparison, the sheaf coefficients for the college dropout subsample are the largest for any of the three models, being .287 and .280 for first and present occupational attainments respectively. Some of the A coefficients for each of these status effects are negative, but these are more than offset by the dominant salutary status influences.

Finally, the first and present occupational status sheafs for the college graduates are .153 and .181 respectively, somewhat less than those for the high school graduate subsample. Once again, however, not all of the individual effects subsumed under the sheaf coefficients are positive. The strongest negative path is that for the Acquisition Index in relation to present occupational attainments (A: -1.07; B: -.193). Indeed, as the magnitude of this and the other paths imply, the negative effects subsumed under the sheaf appear to more than offset the positive influences of particular background status items.

Such results make clear the fact that "SES," so often treated as a unitary construct, does not necessarily have unit character in the sense that all of the effects of all of its various dimensions must be "harmonious" and "crystallized" under all circumstances. In this instance, the nature of the offsetting effects for the various status indicators indicates somewhat of a direct depressant effect for status background on present occupational attainments when present occupational status is controlled. A substantive interpretation for this finding might be couched in terms of floor and ceiling effects encountered in the study of the attainment process. On the basis of various background characteristics, "elite" youth might be expected to assume even more "elite" positions in their own status attainments. But, given the upper limit on occupational status attainments reflected both in our scale and, presumably, in reality, such youth probably evidence greater occupational stability, given relatively high starting positions, than might be expected. On the other hand, given the floor for downward mobility, more low status youth than might be "expected" actually rise in the status hierarchy. Thus, among college graduates, status background is modestly negatively related to present occupational attainments when early occupational status is controlled.

Regardless of whether we choose to attribute substantive importance to the dominance of negative effects in this relationship, the results at least confirm our hypotheses regarding the relative importance of aptitude and background influences for the occupational attainments of college graduates.

In conclusion, then, our results are generally as expected, except for the reversal of anticipated effects for high school graduates and college dropouts. The influence of academic aptitude on occupational attainments is most marked among college graduates, while social origins are least influential for this sample. At least part of this aptitude influence may be mediated through further educational attainments, by affecting the likelihood of graduate school enrollment. On the other hand, social background influences are most important for the career attainments of college dropouts; whereas, aptitude effects are inconsequential for these respondents. Lastly, both academic aptitude and social origins play minimally significant roles in the career attainments of high school graduates. As was expected, the status background influences somewhat exceeded the aptitude effects for this subsample.

It would seem then, that Eckland's interaction hypothesis is largely substantiated in our data. Our results regarding college dropouts and graduates are entirely consistent with his analysis. Since his sample included only college-goers, we cannot evaluate our results for high school graduates against his data. Nevertheless, the finding of modest aptitude-origins influence, with the latter somewhat exceeding the former, seems quite reasonable. High school educational certification probably provides less definition of career boundaries than do more advanced educational levels. Consequently all pertinent factors are likely to have import for occupational outcomes at this educational level.

Summary and Conclusions

It seems that we have already covered considerable area in our "groundwork" setting analysis of general status attainment models. Most of this analysis can be considered replication research. It has served at least two functions: the assessment of the comparability of these basic processes in our model with those established in previous research; and the presentation of the broad attainment dynamics for our sample from which to move to the specification of these processes within particular educational settings. Thus, we have now established the broad framework and can proceed to fill in some of the details which have been slighted to this point. As our introductory chapter emphasized, one principal area of more intensive examination will pertain to the role of contextual variables in these processes. But before moving on, it will be useful to briefly summarize our major conclusions to this point.

Our replication of the Blau and Duncan basic model revealed considerable congruence in the status attainment dynamics of their sample and ours. The major difference between the two involved the intervening role of educational attainments. For our sample, educational attainments were somewhat more dissociated from social origin influences and somewhat more important in influencing early and subsequent occupational attainments. In both samples, the direct effect of educational levels on present occupational attainments exceeded that of early occupational influences.

Our first elaboration of this model included academic aptitude influences and our full set of six background status indicators. As in our preliminary model, years of education remained the principal explanatory variable for occupational achievements. The direct effects of aptitude on occupational attainments fell below our criteria for inclusion in the reduced form model, while the status effects appeared marginally significant. Much of the effects of both aptitude and status variables on occupational outcomes were mediated through educational attainments, as was hypothesized to be the case. In addition, our results attributed somewhat greater influence to aptitude, as opposed to social origin factors, in these processes. Previous research findings had been inconsistent on this point. While our data favor the aptitude predominance position, they are certainly far from conclusive. Furthermore, the differences in magnitude of influence could hardly be considered dramatic. Finally, the inclusion of six status indicators revealed considerable inconsistency in the direction of their influences, with negative status effects often at least partially offsetting salutary status influences. This complexity in the influence of social origins on attainment outcomes would be overlooked if such analyses were restricted to the one or two most commonly employed family background variables.

The further elaboration of this model through the inclusion of the intervening subjective educational expectations item revealed the primary importance of social origins in this case. The educational expectations item is the only dependent variable examined thus far for which all six status indicators had positive path coefficients. Educational expectations, in turn, had considerable direct influence on actual educational attainments, adding some unique explanatory power and mediating much of the influence of antecedent variables in the model.

Finally, the basic model was explained separately for three educational attainment levels: high school graduates; college dropouts; and college graduates. Once again, our data were supportive of previous analyses of these processes, in this case Eckland's 10 year follow-up study of 1952 freshmen at the University of Illinois. Both academic aptitude and social origins were found to be minimally significant in relation to the occupational attainments of the high school graduates. As predicted, for college-dropouts background status influences clearly exceeded those for academic aptitude (which were non-existent); while just the opposite was the case for the occupational attainments of college graduates. Consequently, these background influences seem to interact in a rather complex fashion with educational attainments in effecting occupational career outcomes.

With these preliminary analyses completed, we can now turn to an elaboration of these models in high school and college educational contexts. The first step in this elaboration will introduce more interpersonal-subjective variables to the model, to examine further the dynamics through which antecedent variables actually affect attainment outcomes.

CHAPTER 7

HIGH SCHOOL ATTAINMENT PROCESSES

In this chapter we shall further elaborate our basic attainment model in order to specify some of the more subjective and interpersonal dynamics of the attainment process. Up to this point our attention has been restricted, in large measure, to what might be termed the structural and ascribed dimensions of this process. Although the influences of "background" factors, such as social origins and intellectual capacity, on educational and occupational attainments are relatively well documented, the mediation of their impact through a wide range of interpersonal experiences and value orientations is less well established. We have already begun to explore these mediation processes with the inclusion of a goal-orientation, educational expectations item in the extension of our basic model. In this chapter we shall assess the intervening role of such subjective-interpersonal elements further. Later we will explore contextual influences on these processes. Our models at this stage of the analysis will pertain to high school setting variables affecting educational and occupational attainments. In the following chapters we shall examine similar models in the college setting.

The Full Attainment Model

Tables 7.1 and 7.2 present the means, standard deviations, and inter-item correlations for all the models to be discussed in the next two chapters. The three attainment variables, educational, early occupational, and present occupational attainments, are the ultimate dependent variables for each of these models. The first thirteen variables, father's education through educational expectations, will also be included in all models and will be our major focus of attention in this chapter's analyses. The remaining five variables are the high school contextual and curriculum membership items described in our methodology chapter. The first two of these are the "total school" contextual measures, while the second pair are the within-curriculum items. The contextual analysis will essentially involve the addition of these variables to the "full" attainment model to be developed later.

Each of our models in this chapter will be presented in both full and reduced form. Most of our substantive discussion will pertain to effects included in the reduced model, with some attention devoted to the paths which are not retained. As in our preceding analysis, the six status background variables will be treated as a set. Thus, these variables will all be included in the reduced model when the sheaf coefficient

TABLE 7.1

MEANS AND STANDARD DEVIATIONS FOR MAJOR VARIABLES EMPLOYED IN THE HIGH SCHOOL LEVEL PATH ANALYSIS

	S1	S2	S3	S4	S5	S6	Apt	Peer	Stand 1	Parent	Teach
Mean	3.53	2.59	3.28	0.03	3.00	2.52	7.57	4.99	2.69	2.19	1.63
Standard Deviations	1.35	1.37	1.72	0.89	0.80	0.62	3.90	1.58	0.85	0.68	0.61

	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2	Con 1	Con 2	Con 3	Con 4	Curric
Mean	0.83	1.92	5.30	2.60	3.47	6.98	3.24	7.14	3.29	0.43
Standard Deviations	0.79	0.84	1.62	1.59	1.52	1.12	0.58	1.66	0.74	0.50

TABLE 7.2

INTERITEM CORRELATION COEFFICIENTS FOR HIGH SCHOOL ATTAINMENT PROCESS AND CONTEXTUAL VARIABLES, FOR MALES

	S2	S3	S4	S5	S6	Apt	Peer	Stand 1	Par-ent	Teach	Imag 2	Ed Ex	Educ 1	Occ 1	Occ 2	Con* 1	Con 2	Con 3	Con 4	Cur-ric
S1	.382	.558	.424	.266	.318	.211	.289	.122	.238	.144	.148	.314	.268	.207	.271	.177	.240	.265	.294	.273
S2		.592	.459	.395	.384	.312	.292	.216	.210	.105	.127	.360	.383	.335	.372	.192	.260	.293	.333	.271
S3			.480	.333	.388	.354	.305	.235	.287	.146	.143	.364	.376	.290	.334	.238	.312	.348	.389	.336
S4				.396	.439	.294	.361	.200	.353	.211	.124	.368	.342	.337	.297	.317	.444	.379	.456	.326
S5					.455	.182	.173	.194	.167	.095	.127	.258	.180	.154	.149	.040	.067	.103	.105	.137
S6						.169	.261	.147	.184	.161	.077	.244	.209	.200	.244	.142	.240	.220	.283	.223
Apt							.294	.487	.256	.122	.393	.355	.483	.406	.421	.227	.200	.380	.305	.352
Peer								.295	.323	.461	.160	.525	.439	.377	.383	.143	.304	.297	.395	.385
Stand 1									.359	.227	.429	.381	.492	.441	.429	-.005	.039	.186	.165	.294
Parent										.426	.183	.505	.374	.324	.342	.092	.182	.320	.332	.433
Teach											.100	.307	.202	.202	.177	.032	.120	.189	.212	.286
Imag 2												.221	.286	.268	.264	-.051	-.020	.104	.079	.175
Ed Ex													.494	.377	.407	.109	.193	.351	.362	.450
Educ 1														.667	.734	.166	.255	.400	.410	.445
Occ 1															.626	.129	.243	.334	.372	.398
Occ 2																.147	.225	.353	.361	.387
Con 1																	.648	.732	.555	.194
Con 2																		.545	.846	.334
Con 3																			.798	.672
Con 4																				.648

*The contextual variable labels correspond to the following items: Con 1, high school average aptitude; Con 2, high school average father's education; Con 3, within-curriculum average aptitude; Con 4, within-curriculum average father's education.

TABLE 7.3

FULL MODEL HIGH SCHOOL ATTAINMENT PATH COEFFICIENTS, FOR MALES*

Independent Variables	Dependent Variables								
	Peer	Stand 1	Parent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
Occ 1									.216
Educ 1								.520	.505
Ed Ex							.174	-.029	-.007
Imag 1						.017	.023	.036	.016
Teach					-.008	.052	-.018	.026	-.018
Parent					.011	.233	.035	.015	.050
Stand 1			.274	.208	.313	.112	.236	.113	.035
Peer		.164			-.007	.271	.147	.060	.017
Apt	.176	.422	.044	-.032	.249	.070	.183	.041	.033
SES	.355	.104	.304	.201	.093	.206	.183	.120	.118
R^2	.199	.272	.225	.089	.237	.437	.449	.486	.591

"A" Coefficient For:	Peer	Stand 1	Parent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
S1	.312	-.560	.220	.278	1.11	.311	.071	-.150	.493
S2	.206	.039	-.141	-.219	-.203	.530	.717	.643	.688
S3	.062	.424	.276	.060	-.621	.136	.300	-.376	-.212
S4	.547	-.174	.802	.736	-.278	.126	.279	.844	-.408
S5	-.124	.926	-.062	-.189	.428	.292	-.356	-.326	-.459
S6	.265	-.019	.003	.408	-.214	-.092	-.060	.134	.679

*Most of the path coefficients in this and our other tables have also been computed with inter-item correlations corrected for attentuation due to random measurement error. These corrections are based on the reliability estimates for our factor weighted scales. The three scales in our analysis with such estimates are the Acquisition Index and the two academic self-concept indices. The correction for attenuation involves the division of inter-item correlations by the product of the square root of reliability estimates (Heise, 1969; Althauser and Heberlein, 1970). Hence, the formula for the correction for attenuation is:

$$r'_{ij} = \frac{r_{ij}}{\sqrt{r^2_{ii}}\,\sqrt{r^2_{jj}}}$$

When no reliability estimate is available, the reliability coefficient for that variable is generally assumed to be unity. Given that our which summarizes their gross effects exceeds our .10 cut-off level. Although these gross sheafs are often quite modest, considering that they subsume the effects of fully six social status indicators, we feel that it is desirable to retain this relatively liberal cut-off point for the attribution of "significance." The decision to retain the six as a set in the models even when demonstrating only modest effects is dictated by our interest in exploring, in detail, the effects of these indicators, both individually and in concert.

Tables 7.3 and 7.4 present our fully elaborated high school attainment models, excluding contextual variables. A first point of interest is the explanatory power of the full model[1] for our three ultimate attainment variables. The proportion of explained variance for educational attainments and the two occupational status variables in Model 7.3 are .449, .486, and .591 respectively. These figures may be compared with the corresponding values of .384, .469, and .591 for the basic model presented in Chapter III which included only the six status indicators, academic aptitude, and educational expectations as explanatory variables. Thus, it is obvious that the inclusion of five interpersonal--subjective mediating variables in Table 7.3 adds little unique explanatory power to our basic model. The only notable increment in explained variance is for the educational attainment item. As had been anticipated, the inclusion of these intervening variables serves largely to specify the working out of these processes, while accounting for little, if any, additional variance in the dependent variables. Consequently, the considerably more parsimonious basic model subsumes almost all the explanatory power to be obtained from any of our more elaborate model-building endeavors. The major contribution of our extensions, then,

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coefficients are reasonably high, being .83 for the Acquisition Index, .90 for the high school academic self-concept index, and .74 for the college-level index, division by their square roots results in relatively little change in our inter-item correlations. The largest change in coefficients for the model presented in Table 4-3 is a .051 increase in the Acquisition Index-Parental Contact Beta coefficient. Most other increases are considerably smaller than this. In general, the correlation only modestly increases the paths into and for the variables with reliability estimates. Since the corrected paths are not dramatically different than the uncorrected ones, the latter will be presented in all of our analyses. It should be noted, however, that these paths are somewhat attenuated by random measurement error.

[1] It will be observed that the "full" model does not include all possible paths. Rather, we have calculated only those that would be theoretically meaningful should they prove to be of significance. Thus, we shall not explore the relationship between the parental and teacher contact items, or the effect of peer plans on either of these adult influences.

TABLE 7.4

REDUCED MODEL HIGH SCHOOL ATTAINMENT PATH COEFFICIENTS, FOR MALES

Independent Variables*	Dependent Variables								
	Peer	Stand 1	Par-ent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
Occ 1									.234
Educ 1								.546	.542
Ed Ex							.182		
Parent						.251			
Stand 1			.292	.195	.311	.151	.247	.149	
Peer		.164				.284	.151		
Apt	.176	.422			.241		.190		
SES	.355	.104	.315	.196		.222	.183	.135	.122
R^2	.199	.272	.224	.089	.228	.432	.476	.479	.585

"A" Coefficient For:	Peer	Stand 1	Par-ent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
S1	.312	-.560	.213	.286		.297	.087	-.065	.473
S2	.206	.039	-.124	-.240		.509	.697	.546	.628
S3	.062	.424	.292	.035		.171	.294	-.291	-.106
S4	.547	-.174	.791	.740		.153	.300	.852	-.302
S5	-.124	.926	-.064	-.190		.261	-.349	-.313	-.384
S6	.265	-.019	-.003	.424		-.086	-.071	.153	.645

*In this table, as in a number that follow, teacher-counselor contact and academic self-concept have no significant impact on subsequent dependent variables. Hence, they have been omitted from the "Independent Variables" column.

is the specification of some of the mechanisms by which the basic factors actually affect later outcomes.

Turning now to the reduced model in Table 7.4, we can first note the large number of omitted direct paths. Our assumption that the intervening variables serve largely to mediate antecedent influences anticipates many such non-significant direct effects. Indeed, for present occupational attainments, none of the high school variable paths was retained. Thus, as in our earlier models, only the set of six status indicators, educational attainments, and early occupational status have sizable direct effects on present occupational status. The direct status background influences are clearly the weakest of the three. Given these results, we can conclude that none of the direct antecedent or intervening variable effects on present occupational attainments is dramatic. Rather, almost all of these effects are mediated through educational and early occupational attainments. Similarly, the only significant direct effect on early occupational status, besides those for educational level and, marginally, for social origins, is for the sophomore class quartile academic achievement measure (Stand 1). Thus, in this case also, most of the modest influences of the various high school variables in the model are mediated through their effect on educational attainments.

The direct paths to educational attainments are somewhat more numerous. Yet the effects for three of our variables, academic self-concept, parent contact, and teacher-counselor contact, are still insignificant. Furthermore, the influences on education that are manifest serve, in large measure, to mediate the effects of various antecedent variables. For example, while the direct social origins and aptitude paths on educational attainments in our first "basic model" were .303 and .367 respectively, these paths drop to .183 and .190 in the "full" model currently under consideration. Thus, almost half of these initial direct effects are mediated through the subjective-interpersonal variables that intervene between background influences and educational attainments. The single largest such indirect effect is that for academic aptitude through sophomore quartile standing, with a path of .103. Other indirect aptitude influences are through peer college plans and, in two stages (through both sophomore achievement and peer plans), through educational expectations. Modest indirect status effects on educational attainments are directed through educational expectations, sophomore quartile, and peer plans. Thus, the mediation of these background influences is well documented in our model.

Before continuing our discussion of direct and indirect effects in this model, it will be useful to note the absence of some paths that had been anticipated to be of significance. The role of our academic self-concept index in this model is particularly interesting in this respect. As would be expected, both academic aptitude and sophomore academic achievement have considerable effect on academic self-concept scores, with respective direct paths of .241 and .311. No other direct effects were large enough to merit retention in our reduced model, although both social origins and peer plans have modest indirect effects on the self-concept index by affecting sophomore quartile standing. Interestingly, though, this index does not relate significantly to any of the subsequent variables in the model. Thus, at least for our sample, academic self-concept does not affect either educational expectations, educational attainments, or occupational status accomplishments. The fact that the self-concept index is at least partially explicable though academic aptitude and performance measures provides some confidence in its validity, yet it itself plays no role in influencing later educational goal-setting or attainments.

This interesting role, or lack of a role, of academic-intellectual self-conceptions, in conjunction with the various influences on the educational expectations item, may be pertinent to the polemic over the role of "intellective" forces in high school achievement and academically-oriented goal setting. It will be noted in Table 7.4 that the direct influence of academic aptitude on educational expectations is non-significant, while that for the sophomore quartile standing indicator is only .151. On the other hand, the direct effect of social origin alone is .222, and largely salutary (i.e., subsumes little offsetting negative status indicator effects), and those for peer plans and parental contact are .284 and .251 respectively. In addition, there would be modest positive indirect social origin influence through both of these last two variables. These figures all imply that the major determinants of educational expectations and goals are non-academic influences, principally parental social status and contact with parents regarding college plans. The only other direct major influence appears to be the orientations of the one's peer group. Academic ability, performance, self-conceptions, and teacher-counselor contact are seen to have little or no influence on academic goal setting.

These results are consistent with the implications of Coleman's research on the "adolescent society" (1966) and other research (Haller and Butterworth, 1960; McDill and Coleman, 1963 and 1965) regarding the importance of peer influences in high school and the separability of peer and parental influences as "significant others" in the goal setting process. On the other hand, the comparably sized direct positive paths for both parental contact (.251) and peer plans (.284) on goal setting indicate that these influences are often congruent and mutually reinforcing, as is the import of considerable previous research (Simpson, 1962; Kandel and Lesser, 1969). Finally, it appears that academic performance-ability variables, as such, have little effect on educational goal setting. Sewell's (1970) research, on the other hand, would similarly confirm the importance of "significant others" in the goal setting process, but would attribute somewhat greater significance to academic performance and somewhat less to social origins than does our model. It is possible that the relative importance of performance and origins may reverse between the sophomore and senior years as the college transition approaches and the salience of grade point average as a selection criterion increases. Our data indicate that ability and performance factors are the major determinants of educational attainments. Furthermore, it is likely that expectations will become more "reality-bound" as the college transition approaches. This being the case, ability and performance influences on educational goal-setting should increase over time. Consequently, the differences between his senior and our sophomore sample may, at least on this point, be substantively explicable.

While both peer plans and parental contact regarding college plans appear to have some influence on educational expectations and, for at least the former, on actual educational attainments, the teacher-counselor contact item has no effect on any of these dependent variables. In Sewell's work (Sewell, Haller, and Ohlendorf, 1970; Sewell, Haller, and Portes, 1969) the influences of these three reference groups were subsumed under a single composite "Significant Others' Influence" index. His models did reveal a sizable direct path of .508 from this composite index to educational expectations. Our data, however, indicate that the contribution of the three items in his index should be quite unequal, with the effect for teacher urgings being quite modest, while those for both peer plans and parental encouragement should be roughly comparable and sizable. Hauser's (1972) recent "disaggregation" of Sewell's composite indices will permit us to evaluate these individual effects. It seems that these influences are largely as would be expected on the basis of our data. Although the direct effect of teacher's urgings on educational expectations are considerably larger in Hauser's analysis than in ours, with a direct path of .122, this path is but one-half the size of the parental and peer paths of .257 and .213 respectively. Thus, the ranking of the three "significant other" groups would be consistent in the two studies.

It might be noted than Sewell's item wording in the parental and teacher influence measures more clearly reflect adult encouragement regarding college plans (i.e., "My teachers in high school have encouraged me to go to college"; "My parents want me to go to college") than do our "contact" items ("To what extent have you discussed going to college with . . .?"). Consequently, this difference in item wording may account for differences in the importance of teacher-counselor contact in the two models. Another possible explanation might involve heightened significance of the "teacher as counselor" role at the high school senior level, as compared with sophomore counseling responsibilities. Williams' (1972) recent two-stage study of these processes in sophomore and senior years, however, does not support these speculations. In the sophomore year he found parental effects on aspirations to be dominant, followed by significant teacher effects, and, finally, insignificant peer influences. The ranking of the three "significant other" groups remained unchanged at the senior level, with the only difference being an increase in the parental path. Thus, relative influences were not found to change between the tenth and twelfth grades as we anticipated they might. However, Williams' analysis accords considerably more significance to teacher influences than does either Sewell's or our data. All three studies find parental influences to be somewhat more important than those for peers (in our data this requires the addition of parental SES effects to parental contact influences), which is consistent with other analyses of these issues (Kandel and Lesser, 1969).

Nevertheless, Hauser's reanalysis of the Sewell data does indicate that teacher encouragement is the least important of the three "significant other" influences on educational expectations. Thus, the ranking of the importance of the various "significant other" persons and groups would be quite similar in our two studies.

Having already discussed somewhat Sewell's model of attainment processes, it might be informative to pursue further the comparison of our results with his. Sewell's full and reduced path models are reproduced in Table 7.5. It will be recalled from our introductory chapter that the variables included in our model and their order of causal priority parallels Sewell's quite closely. Indeed, Sewell's research on his 1957 sample of Wisconsin high school seniors has provided the basis for much of our thinking in the development of our own models. Except for our inclusion of an academic self-concept index (which proved to have little explanatory utility), our distinction between early and present occupational attainments, and Sewell's use of both educational expectations and occupational aspirations as dual goal orientation indicators, there is actually a one-to-one correspondence between the variables (but not measures) employed in the two models.

With but one exception, the casual orderings of the variables in the two models also correspond. This one exception involves the placement of our peer plans index. Sewell and his associates hypothesized that the significant others' index was likely to be affected by academic performance rather than the reverse. That is, others' evaluations of a student's academic potential are likely to be strongly influenced by his previous performance. Hence, the college-urgings of various significant others are, in large measure, contingent upon the student's demonstrated ability.

This argument is quite persuasive for the parental and teacher encouragement items in the "significant others" index, but a quite different conceptualization seems reasonable regarding peer influences. It will be recalled that the peer items refer to actual educational plans (in both studies), while the teacher and parental items refer either to college-going encouragement or discussions of college plans. Thus, the peer items might be taken to imply modeling influences as opposed to the parental "urging" or encouragement variables. If academic performance is to affect peer college plans, it is most likely to do so indirectly through influencing the selection of friends. High performance students are likely to seek friends with similar academic interests and educational goals. Thus, the direct causal relation between performance and peer plans is probably a spurious function of one's own academic interests and abilities. In all likelihood, these processes are mutually reinforcing over time, with abilities and interests affecting both performance and peer choice which, in turn, affect subsequent interests and performance, etc. Our models are much like stop-action photographs of this circular

TABLE 7.5

SEWELL'S FULL AND REDUCED MODEL PATH COEFFICIENTS FOR THE HIGH SCHOOL ATTAINMENT PROCESS VARIABLES,* TOTAL SAMPLE

Full Path Model

Independent Variables	Dependent Variables					
	Stand 1	Sig Oth	Ed Ex	Occ Asp	Educ	Occ
Apt	.581	.179	.076	.127	.080	.031
SES	.026	.246	.168	.163	.128	.070
Stand 1		.320	.176	.194	.172	.035
Sig Oth			.434	.359	.177	.050
Ed Ex					.350	-.072
Occ Asp					.100	.150
Educ						.480
R^2	.347	.318	.442	.410	.598	.405

Reduced Path Model

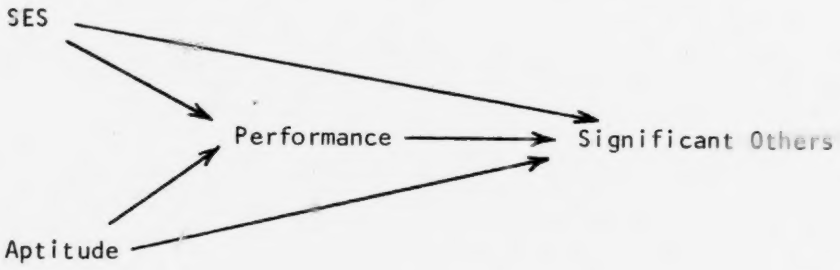
Independent Variables	Dependent Variables					
	Stand 1	Sig Oth	Ed Ex	Occ Asp	Educ	Occ
Apt	.589	.179				
SES		.246				
Stand 1		.320	.218	.261	.218	
Sig Oth			.508	.441	.227	
Ed Ex					.457	
Occ Asp						.152
Educ						.522
R^2	.347	.318	.410	.372	.572	.395

*Our variable labels have been substituted for Sewell's notation when appropriate. The exceptions are the following: SES: Background socioeconomic status, a composite index of father's education, mother's education, father's occupation, and average annual family income from 1957-60; Sig Oth: Significant Others' Influence Index; Occ Asp: Occupational aspirations. Academic Performance was the youth's high school class percentile rank. From: Sewell, Haller, and Ohlendorf, 1970.

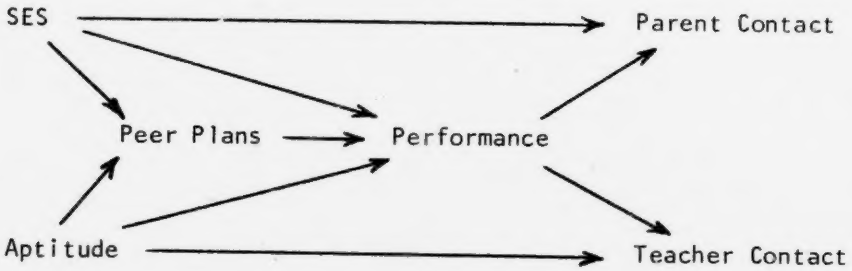
process, with the choice of dependent variables largely arbitrary, assuming that the timing of our variable measurement imposes no invariant ordering on their arrangement in a causal sequence.

Given the considerable attention that has been devoted to the "adolescent society" in high school settings, it would seem at least equally as reasonable to postulate that peer educational orientations and, presumably, modeling influences affect academic performance as to hypothesize the reverse effect. Indeed, this cause-effect linkage, as indicated above, would seem the more direct of the two. The differences in the causal ordering of this segment of Sewell's and our models may be presented as follows:

Sewell Model


SES
Performance
Significant Others
Aptitude

Our Model


SES
Parent Contact
Peer Plans
Performance
Aptitude
Teacher Contact

Thus, our model includes peer educational plans as antecedent to the performance item. The direct path of .164 in Table 7.4 indicates a modest influence in this direction. Had we reversed the direction of influence, as in the Sewell model, we would have obtained a direct path of .175 from performance to peer plans, which could be compared with the corresponding paths of .292 and .195 for performance on parental and teacher-counselor contact respectively. In Sewell's model, these paths are .203, .178, and .354 (Hauser, 1972).

At any rate, either hypothesized causal ordering for the peer plans variable is seen to provide substantively meaningful and interpretable results. Such results draw attention to an often neglected limitation of path analysis as an analytic tool. Path analysis cannot legitimately be employed to select between alternative postulations of causal orderings, as for example Rehberg, Schafer and Sinclair (1970) attempt to do in their models of goal setting. Rather, it is a technique for estimating effect parameters in situations where the causal priority of variables is not at issue. Thus, Heise (1969) treats an incontrovertable causal ordering of variables as one of the assumptions of path analysis. This being the case, we present our peer influence-academic performance linkage as a reasonable alternative to the direction of effect hypothesized in Sewell's analyses. Since our methods of analysis do not permit us to choose between the two conceptualizations, the final decision must, perforce, be a theoretical one. We would argue that the rationale underlying our causal ordering is consistent with the implications of a large body of literature in this area and requires fewer intermediate linkages to provide substantive meaning to the causal relationship than is the case with Sewell's postulated direction of influence.

Aside from the differences already noted between the two models, their major implications are quite consistent. Moreover, most of the differences seem to be substantively interpretable. This is true, for example, of differences in the explanatory power of the respective models. Sewell's total sample model (1970: 1022-1023) accounts for 40 percent of the variance in occupational attainments and 57 percent of the variance in educational level achieved. The corresponding figures for our reduced model are .578 for present occupation, .476 for early occupation (which would correspond more closely to Sewell's "present occupation" in his seven year follow-up), and .449 for educational attainments. Thus, our model has greater explanatory power regarding occupational attainments, but considerably less so with regard to educational outcomes.

These differences are to be anticipated, however, given the differences in sampling and research design strategies between the two projects. It will be recalled that Sewell's sample consists of high school seniors. Consequently, all of his high school level measures, such as grade point average, significant others' influence, and educational expectations, should have considerably greater predictive utility regarding the transition to college than would the corresponding variables for our sophomore sample. Considering the imminence of that transition for a senior sample, the heightened explanatory power of such variables should not be surprising. For example, Sewell's total sample correlation between educational expectations and educational attainments is .696, as compared to .494 in our sample.

Just the opposite is the case with occupational attainments, however, where the length of the follow-up period would seem to be the significant factor. Thus, Sewell's seven year follow-up hardly allows for any career mobility for respondents who may have gone on to graduate school, or even just attended college for four continuous years. Consequently, the variance in his occupational status dependent variable should be at a minimum. Our fifteen year follow-up, on the other hand, allows for a full five years of occupational experience for those who might have received four years of post-graduate education (assuming continual college attendance). Thus, the longer duration of our follow-up would permit more extensive occupational sorting, and, consequently, greater variation in occupational attainments. In our data, however, the standard deviations for our first and present occupational status items are essentially equal, at 1.59 and 1.52 respectively. This can be attributed to the high degree of modality in the extreme response category on the first occupation item, in which almost one-third of the respondents fell into the lowest category (unskilled and semi-skilled). Still, it is interesting to note that the level of explained variance for our first occupation measure is considerably closer to that obtained in Sewell's study. This measure would probably correspond more closely to Sewell's "present occupation" item in terms of the length of work experience to which it refers. Sewell and his colleagues (1969: 91) themselves anticipate greater occupational attainment explanatory power in follow-up studies of greater duration.

In both studies, as in the Blau and Duncan model, educational attainments is the single most important determinant of occupational attainments. As in our data, Sewell's analysis failed to uncover a significant path from educational expectations to occupational status, however, they did obtain a significant occupation path for their occupational aspirations item. Had this latter variable been omitted from their model, it is likely that the educational expectation item would have picked up some of this effect (the two goal-orientation variables correlate .771).

Our model indicates a greater number of significant direct paths into the educational attainment variable than is reflected in Sewell's models. In their research the direct paths for both academic aptitude and social origins drop out, while both of our effects are somewhat above Sewell's .15 cut-off point. While some of our status item paths into the sheaf coefficient are negative, the SES path of .183 merits retention in our reduced model. The dominant effect on educational attainments in the

Sewell model is the educational expectations item, while considerably lesser, and approximately equal influences, are noted for the significant others' index and academic performance (a .128 path for their SES index is also included in their full model). Hauser's (1972) decomposition of the significant others' index indicates that most of the index effect can be attributed to the "peer plans" item (direct paths for teachers, parents, and peers are .018, .075, .123).

In our model, no single effect on educational attainments is predominant. The largest direct path is for the sophomore quintile item at .247. The other direct effects, for educational expectations, peer plans, academic aptitude, and status origins are all in the .15-.19 range. Thus, effects on educational attainment are distributed quite evenly over our explanatory variables.

The major contrast between the two models, then, is the greater explanatory power for educational expectations in Sewell's analysis. This one effect may account for much of the remaining difference between the two models. It will be recalled that we have previously proposed a substantive explanation for the sizable expectation-attainment linkage in Sewell's model, involving the anticipated greater correspondence between these two variables for seniors than for sophomores. Consequently, much of the direct influence of antecedent variables found in our model is mediated through the two goal orientation items (educational expectations and occupational aspirations) in Sewell's analysis.

Finally, it is of interest to observe that the only notable "significant other" influence on educational attainments in our model is for the Peer Plans Index. Hauser's (1972) reanalysis of Sewell's data indicates that the same is true for their Significant Others' Influence Index. If our interpretation of the larger role of educational expectations in Sewell's analysis of educational attainments is accurate, then most of our educational attainment results are consistent, and our differences are substantively interpretable.

Turning next to educational expectations as a dependent variable, we can observe considerable congruence in the two models. While our multiple correlation for the educational goal item is .432, that for Sewell's model is .442. Furthermore, the relative importance of each independent variable in the two models is quite similar. Disregarding specific path coefficients which are item-variance bound (but happen to correspond quite closely in this instance), in both studies the strongest effect on educational expectations is manifest by the "significant others" indices while the smallest path is that for academic aptitude. The latter paths were non-significant in both analyses. Finally, in both cases the effects for social status origins and academic performance fell between these high and low values and are of similar magnitude.

Similar patterns of influence are to be observed on Sewell's occupational aspiration item, so that its omission from the model would probably not dramatically alter the ranking of influences on the educational expectations variable. Thus, once again, we find considerable similarity in the analysis of attainment processes in the two studies.

We have already briefly discussed the somewhat surprising lack of explanatory power for the factor weighted academic self-concept index in our model. Sewell's analysis did not include any comparable self-image measure, although on the basis of his analysis it was speculated that such a variable might indeed play a significant mediation role in influencing attainments (1969: 88-89):

> None of the unpredicted paths is very strong, but we must recognize that there may be more operating in such a system than we were able to anticipate from previous thinking. There is a pair of perhaps consequential direct paths from academic performance to educational aspiration (P = .18) and to educational attainment (P = .17). There are several possibilities. The data might imply the existence of a mediating factor, such as one's self conception of his ability, a factor which could influence both educational aspirations and attainment.

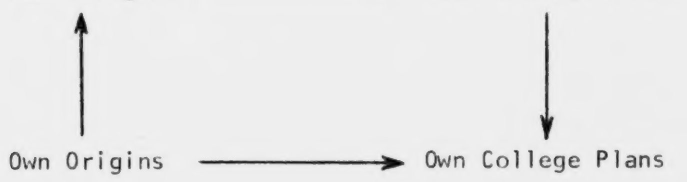
Our data indicate that we have indeed tapped such a self-concept construct in that academic aptitude and performance are the major explanatory variables for the index. Yet it itself fails to play the mediating role that Sewell and his associates speculated might explain their unanticipated paths and which we had hypothesized to be the case. The inconsequence of this self-concept measure, in conjunction with an inspection of the variables actually affecting goal setting, attests to the primacy of social status influences, as opposed to academic ones, in affecting educational expectations.

In both analyses, teacher-counselor college-going influences is the dependent variable least explained by remaining antecedent variables. The squared multiple correlation coefficient for this item in Sewell's analysis is but .216 (Hauser, 1972), as compared with .09 for our study. In both path models it is the least consequential of the three significant other items, although considerably less so in our model in which it fails to demonstrate a single significant direct path to any dependent variable. In Sewell's models the sizable coefficients into teacher's urgings as a dependent variable are for the high school grades and aptitude items (Hauser, 1972). In our analysis, only high school quintile standing and social origins are significantly related to teacher contact. As has already been mentioned, it is possible that the somewhat greater importance for this item in Sewell's model can be attributed to the increased intervention of the teacher as counselor for high school seniors as compared with sophomores. In any case, its importance in both models is minimal.

The other two "significant others" in these models are the peer plans indices and the parental contact-encouragement items. Once again we find considerable comparability in the models' explanatory powers regarding these items as dependent variables. In Sewell's analysis the squared multiple correlation coefficients for these two items are .212 and .239 respectively. In our model, the corresponding coefficients are .202 and .221. All antecedent variables, academic performance, academic aptitude, and social origins, have marginally significant effects on both influence items in Sewell's analysis. All such direct effects are in the .100-.250 range, with no single dominant causal factor.

In our study, on the other hand, only academic performance and social origins have notable impact on parental college-going contact, while only academic aptitude and social origins affect peer plans (note, though, that given our causal ordering of variables, the performance item was not introduced into the equation for the peer influence index). The acquisition index, at .791, has the largest A coefficient into the parental contact sheaf, in the reduced model (Table 7.4). The performance path indicates that parental contact is, to some extent, also affected by school grades, as well as by social background status. These direct performance and social origin effects on parental contact are of similar magnitude. For the peer plans item, on the other hand, social origins has almost twice the influence of academic aptitude (with respective paths of .355 and .176).

This latter result may cast an interesting light on both the peer group formation and educational goal setting processes. Although these observations are quite speculative, it is likely that social class similarity is a fundamental basis of peer group formation (Rhodes, Reiss, and Duncan, 1965). In turn, social class membership, as opposed to academic ability, is the dominant factor in establishing educational goals. Thus, college expectations are largely assumed for upper status youth, to a considerable extent without regard to academic or intellectual interests. This is reflected in the marked social background influences on own educational expectations, as has already been discussed. This being the case, we might offer the following explanation for these social origin influences on peer plans: rather than actually affecting peer plans, these effects are largely indirect, functioning to influence the class background of offspring's close peers; in turn, these peer social origins influence peer educational goals. The social origins-peer plans relationship, then, can be accounted for as a two-stage process, with own origins affecting peer origins, peer origins affecting peer plans, and, finally, peer plans affecting own plans:



Thus, we postulate an unmeasured intervening peer social origins influence which mediates the own origins-peer plans relationship.

Finally, we can briefly compare the role of academic performance in these two models. Throughout our preceding discussion of subsequent variables in these models we have had occasion to evaluate academic performance as an explanatory variable. These effects have been found to be pervasive and of moderate magnitude. We shall now direct our attention to academic performance as a dependent variable. The explained variance for academic performance in Sewell's model is .347, as compared to .272 in our study. It will be recalled that Sewell employed a measure of senior class standing while our indicator is a sophomore quintile self-placement item. In both analyses, academic aptitude is the major determinant of academic performance. Indeed, in Sewell's model academic aptitude is the only significant influence on the performance measure. In our analysis, however, the Peer Plans Index is also observed to have a moderate effect on sophomore class standing. Quite clearly, though, this influence is secondary to the aptitude effect, as is evident in their respective paths of .164 and .422. It will be recalled that Sewell's causal ordering precluded a peer plans effect on performance.

One final comparison of the two models merits note. In both instances, the influence of social origins on academic performance is of little significance. In Sewell's model this path is .026, while in our reduced model, at .104, it barely meets our criteria for retention. This latter value is so small as to be of little substantive consequence and may be treated as essentially "insignificant." Given the limitations of our twenty item test of academic aptitude, we might conclude that, with academic aptitude controlled, social status background has no effect on class standing, at least for the youth in our and Sewell's sample.

Summary of Full Attainment Model

Before turning our attention elsewhere, it is appropriate first to recapitualte briefly our conclusions regarding the full attainment model for males. The paths retained in the reduced model may be portrayed diagramatically as seen in Table 7.6.

As was reflected by the absence of significant direct paths into the occupational attainments item, and the essentially unchanged multiple correlation coefficients from the basic model, most of the influences on occupational attainments were mediated through educational effects. Thus, educational attainments was, by far, the major determinant of both early and present occupational statuses in our models. The only other significant direct influence on the reduced model was for academic performance on first occupational status. Thus, independent of its influence on years of education eventually received, sophomore class standing appeared to have a modest direct impact on initial job status. Presumably, a senior class performance measure would have an even stronger impact on early occupational attainments.[2]

Educational attainments, in turn, were seen to be influenced by a considerably broader range of factors. In our data, academic aptitude, both operating directly and through sophomore performance, appeared to be the major influence on eventual educational levels achieved. Social origins effects were a close secondary determinant of educational attainments. Although the direct status background influences were somewhat less than those for aptitude, social origins were observed to have indirect effects through a number of channels, including, most notably, peer plans and educational expectations. Approximately one-half of the direct effects for both aptitude and social origins noted in our basic model were mediated through the intervening variables introduced in this elaborated model.

While aptitude influences were somewhat the stronger in influencing actual educational attainments, the establishment of educational expectations

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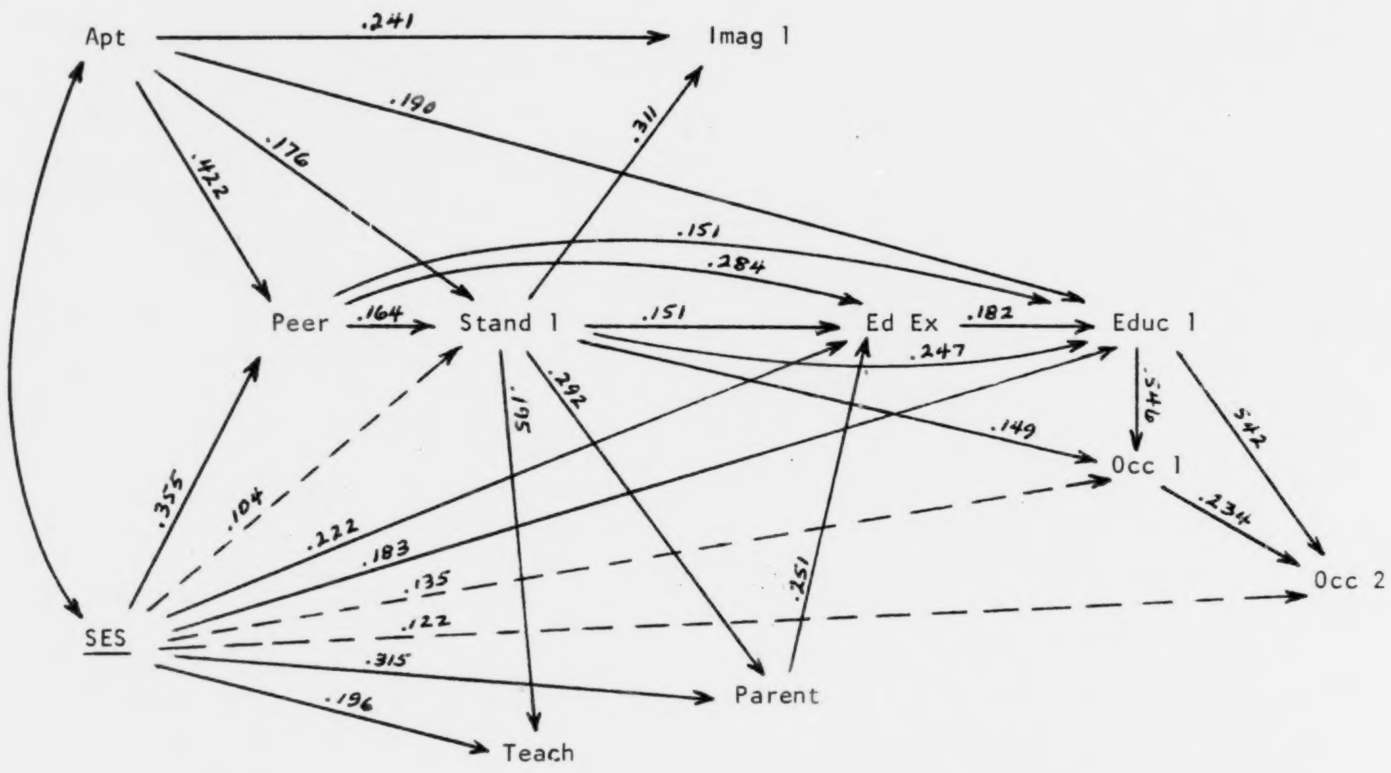
[2] It might be noted that we have not included our senior class standing measure in these high school attainment models. Its inclusion would have compelled the omission of our approximately forty high school dropouts from the analysis. Given our interest in examining the educational attainment processes at their most general level at this point, it was felt desirable to maximize the variation in our education attainments variable. For similar reasons, senior grade point average will not be included as a variable in our college level models. School attrition merits attention as a distinct substantive area. Although our interest in general attainment processes across all educational levels compels us to omit from consideration variables of considerable substantive interest, this is felt to be justifiable. Obviously, all of our models can be elaborated to include omitted variables as our attention focuses on more specific problems. This analysis can be considered preliminary to that narrowing of interests.

TABLE 7.6

DIAGRAMATIC REDUCED FORM HIGH SCHOOL ATTAINMENTS MODEL, FOR MALES*


Apt
Imag 1
.241
.190
.176
.422
.311
Peer
.164
Stand 1
.151
.284
.151
Ed Ex
.182
Educ 1
.247
.195
.292
.149
.546
.542
Occ 1
.234
Occ 2
SES
.355
.104
.222
.183
.135
.122
.315
.196
.251
Parent
Teach

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*Broken arrows from the SES construct indicate sheaf coefficients which exceed our .100 cut-off level, but are so close to it so as to be of little substantive importance.

seemed to be largely a function of non-ability-performance influences. Although the direct path of sophomore standing on expectations was significant, it was the most modest of the effects on educational expectations retained in our reduced model. Peer influences were the dominant determinants of educational expectations, with significant effects also observed for both social origins and parental contact regarding college plans. Even the peer plans path of .284 implied a modest indirect social origins influence. Thus, the setting of educational goals was largely a function of family background and associational influences, regardless of academic abilities and independently of academic performance. It was noted in our earlier discussion that educational expectations themselves play a considerably more modest role in affecting educational outcomes in our analysis than in Sewell's research. It was proposed that sample differences might account for this, with Sewell's sample consisting of high school seniors and ours composed of sophomores. If this explanation is correct, it implies considerable fluidity in educational expectations through the final high school years, becoming more reality-oriented, or more accurate, with the approach of the high school-college transition (Williams' analysis, however, does not support this interpretation).

Somewhat surprisingly, our factor-weighted academic self-concept index was found to have no effect on subsequent educational and occupational outcomes. Even its path to educational expectations was miniscule, providing additional support for the conclusion that non-intellective forces are dominant in educational goal setting.

The three "significant other" indices were noted to have somewhat different patterns of influence. Teacher-counselor contact, the least explained of the three in our model, had modest direct paths into it from academic performance and social origins. It itself had no significant effect on any of the subsequent variables in the model. Parental contact was largely a function of academic performance and social origins, while it, in turn, had a modest effect on educational goals. Finally, peer plans were affected first by social origins and secondly by academic aptitude. Subsequently, peer plans exerted a modest direct influence on academic performance, educational expectations, and eventual educational attainments. Aside from differences in the causal ordering of the peer influence item, our results are quite consistent with those obtained with Sewell's Significant Others' Influence Index. Both analyses indicate that teacher-counselor influences are less significant than those for either of the two other groups. Nevertheless, Sewell's data did attribute somewhat greater influence for the teacher encouragement item than was noted in our analysis. It was speculated that either differences in item wording or the increasing importance of the "teacher as counselor" role between the sophomore and senior years might account for these modest discrepancies between the two analyses.

Finally, the sophomore performance item was noted to have the most pervasive influence of any of the intervening variables introduced in the full attainment model. This item had significant direct effects on parental contact, teacher-counselor contact, academic self-concept, educational expectations, educational attainments, and even early occupational attainments. Its strongest influence was observed for the academic self-concept index, with a direct path of .311. Other sizable effects included a .247 path for educational expectations and a .292 path for parental contact. The academic performance item served largely to mediate the influence of academic aptitude. Both the Peer Plans Index and SES background were found to influence sophomore class standing, with the effect of the latter being of marginal consequence. In Sewell's analysis, the social origins influence on academic performance was not significant. Consequently, almost none of the social origins impact on educational expectations was mediated through performance, further strengthening the arguments for predominately non-academic determinants of educational goals.

Throughout the discussion of our full attainment model we have attempted to provide a rather detailed comparison of our results with those obtained by Sewell in his seven year longitudinal study of 1957 Wisconsin high school seniors. It is to be anticipated that the attainment influences affecting the two samples should correspond quite closely since these youth are of essentially the same age cohort. Students in our 1955 sophomore sample would have been seniors in 1957, exactly the baseline date of Sewell's study. Thus, we should not need to concern ourselves with actual changes in the dynamics of the attainment processes between the experiences of the two samples, as was the case in our comparison with Blau and Duncan's research.

Indeed, as our discussion indicated at a number of points, the two models of attainment influences were largely consistent. Their major differences involved primarily the greater importance of educational expectations in Sewell's model, and, secondarily, a somewhat more pronounced role for teacher counseling influences in his research. Both differences may be explained by differences in our respective sample designs rather than necessarily positing different attainment dynamics for the two samples. It seems entirely reasonable to assume that both educational expectation and teacher counseling influences would be of greater importance for high school seniors as compared with sophomores, given the imminence of the high school-college transition for the former. This being the case, there is no necessary inconsistency in the two models. Rather, it can be hypothesized that were our high school sophomores followed-up as seniors, the effects for educational expectations and teacher counseling in their attainment models would have corresponded to those observed in Sewell's data. Obviously this line of thought is quite speculative, but it seems entirely reasonable given the overall consistency between the two studies and their specific points of divergence. At a later date we intend to examine these expectations with the smaller subsample of 1955 high school seniors who were also included in the EEO follow-up survey.

CHAPTER 8

SEX EFFECTS IN THE ATTAINMENT PROCESS

Our portrait of the attainment process considered thus far suffers in at least one major respect: it is largely restricted to the dynamics of the male attainment process. Of those studies cited in the foregoing chapters which deal with either educational or occupational attainment as an outcome variable, only the two by Sewell and Shah (1967 and 1968) assess sex differences. In part this neglect of female attainments reflects the difficulty of devising a generally applicable measure of female post-educational attainment, yet even the occupational attainments of "working" women and the educational attainments of the female population in general have received little consideration.

The failure to pursue these "pursuable" topics might be less objectionable were it known to result in little loss of information regarding the complexity of attainment dynamics. It is abundantly clear, however, from a wealth of earlier research, that sex effects, both main and interaction, are exceedingly important in the attainment process.

Numerous correlational and tabular analyses of variables such as school retention and educational goal orientations indicate the importance of sex in the attainment process, even after the effects of status background and academic ability have been controlled (Wolfle, 1954; Folger and Nam, 1965; Davis, 1964; Flanagan and Cooley, 1966; Folger, Astin, and Bayer, 1970). Davis (1964, 65), for example, found sex to be almost as important as academic performance in predicting the graduate school plans of college seniors. Similar sex discrepancies in educational expectations among high school seniors (Sewell and Shah, 1967) attest to the generality of such sex differences across educational levels. At a more behavioral level, numerous inquiries (Sewell and Shah, 1967; Flanagan and Cooley, 1966; Folger and Nam, 1965) document a sizable male advantage in college attendance rates at almost every level of academic ability and socioeconomic status. Indeed, even the historical female advantage in terms of high school graduation appears to have been recently reversed, while the male college graduation advantage is but slightly diminished (Knudsen, 1969; U.S. Dept. of Commerce, 1971:80).

The recognition of sex differences in educational attainments, particularly post-high school attainments, is, of course, hardly startling, and such differences do not, in themselves, require the separate consideration of sex-specific attainment processes. Were the intrusion of sex into the educational attainment process limited to a simple, known main effect, considerable economy could be achieved by single-sex inquiries without significant loss of information. Unfortunately, it appears that such a simple additive model does not adequately portray the complexity of attainment dynamics. The aforementioned tabular analyses indicate that the male college-attendance advantage, although evidenced at all levels of SES and ability, is not uniform across these levels. In the Project Talent data (Flanagan and Cooley, 1966:96), for example, this male advantage was greatest among the high ability-low status youth.

The only analyses to date to deal with such interactions within a multivariate modelling framework reflect similar tendencies. Sewell and Shah's studies of Wisconsin high school seniors (1967; 1968) documented a consistent sex interaction with both status background and academic ability across all three of their outcome variables: college attendance plans; actual college attendance; and, college graduation. In each instance, ability effects exceeded those of status background for males, while just the opposite was the case for females. Thus, female attainments appear to be more closely tied to the "ascribed" criterion of family background status, while those of males are more strongly related to the presumably "functional" criterion of academic ability. That these results are consistent across subjective measures of goal orientation, as well as objective outcome measures, suggests the importance of sex role socialization in explaining at least a portion of this sex variability in attainment dynamics. The applicability of the sex role interpretation is further reinforced by Sewell and Shah's (1967) observation that, even with both status background and ability controlled, females are less likely to express college-going plans, to attend college, and to graduate from college.

Sewell and Shah further specified their inquiry by replicating the three variable college graduation model for only those youth in their sample who actually attended college. In this instance, the results for both sexes were quite similar: academic ability remained a major determinant of college graduation; however, the importance of status background, though still significant, was substantially reduced. The authors interpreted these results as offering partial support for Wolfle's (1954:163) oft-quoted statement regarding the diminished importance of status background and the increased importance of academic ability for educational attainments, given selection into college. Not noted by the authors, but pertinent to our interests here, is the striking similarity of the models for both sexes. These data, in contrasting markedly with those for their total sample, suggest that, just as much of the importance of status background for educational attainments is spent at the high school-college transition, so too are sex interactions most pronounced at this crucially important point of educational selection.

Sewell and Shah concluded their analysis by assessing models that included high school educational expectations as an additional explanatory variable in relation to college graduation. While the large "plans" effect did, as anticipated, mediate a substantial portion of the ability and status influences on college graduation, the relative importance of status and ability for both plans and attainments still remained sex specific.

These analyses by Sewell and Shah are the most definitive to date, in a multivariate modelling framework, on sex interactions in the educational attainment process. In light of such documentation it is surprising that the topic of sex effects has not received further consideration. As noted previously, the status attainment literature has been characterized by increasingly complex analytical models designed to assess the dynamics by which various antecedant influences are actually translated in status outcomes. Sewell and Shah's (1967) elaboration of their basic three variable models to include the mediating role of educational expectations represents one such extension. None of the more complex models cited earlier, however, has been employed to explore further the dynamics of sex effects in the attainment process. While it may be something of an exaggeration to conclude that the study of status attainments is usually treated as synonymous with the study of male attainments, the paucity of cross-sex studies certainly suggests that such a judgement would not be far off mark.

By now it has likely been surmized that we intend to explore sex effects, both main and interaction, in an elaborated model of the educational attainment process. Our school process model is an extension of those developed by Sewell and his colleagues (Sewell, Haller, and Ohlendorf, 1970; Sewell, Haller, and Portes, 1969; Hauser, 1972; Sewell and Hauser, 1972) to explore some of the more proximate subjective and interpersonal mechanisms by which status background and academic ability actually affect attainment outcomes. The "mediating mechanisms" in Sewell's models included the influence of various "significant others" (parents, peers, and teachers),[1] educational expectations, occupational aspirations, and high school performance. Both educational and occupational attainments were considered as outcome variables.

The model to be evaluated in this chapter is presented schematically in Figure 8.1. In addition to including most of the variables examined by Sewell, it also has certain distinctive features. The availability of both sophomore and senior year measures of class standing and curriculum enrollment, and the inclusion of significant others' influences,

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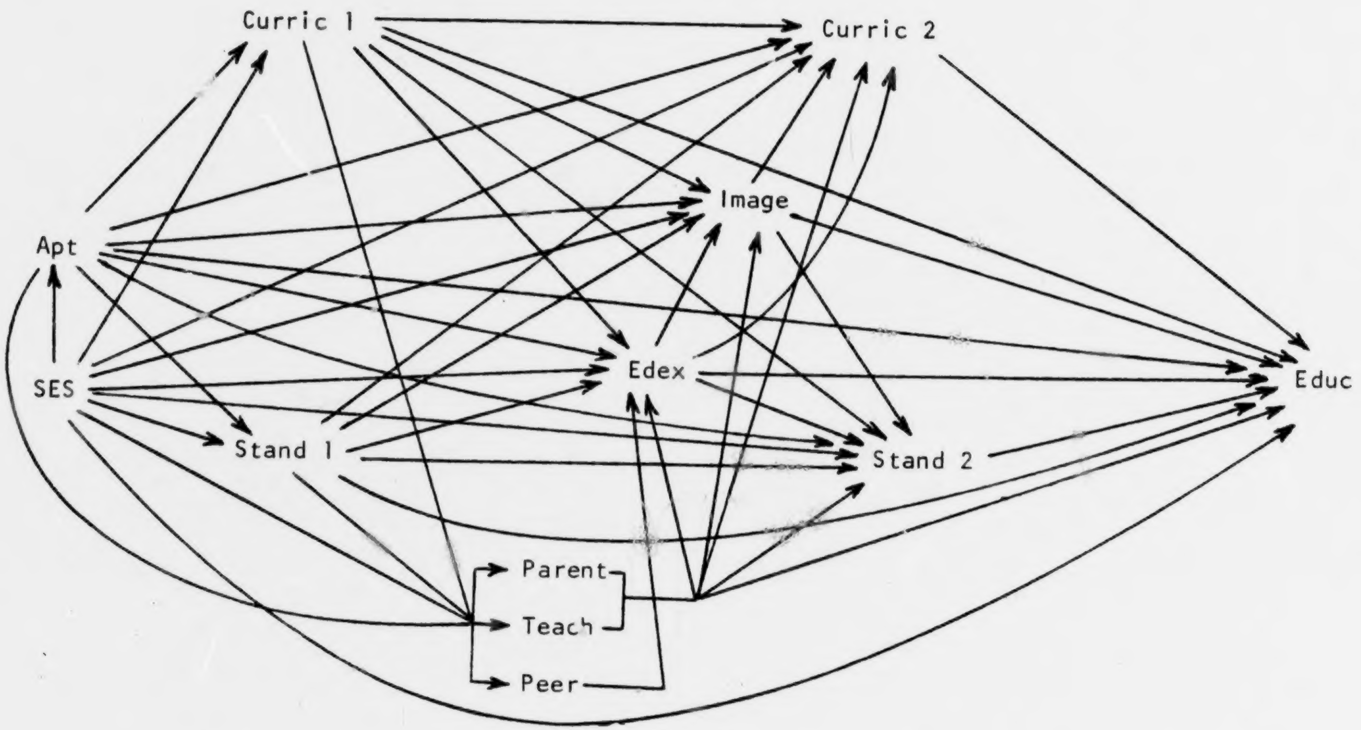
[1] In Sewell's original analysis, these three variables were combined into a single composite index. Subsequent inquiries have decomposed this index in order to assess the separate effects of each significant other influence (Hauser, 1972; Sewell and Hauser, 1972).

FIGURE 8.1

THE SCHOOL PROCESS STATUS ATTAINMENT MODEL*


Curric 1
Curric 2
Image
Apt
Edex
Educ
SES
Stand 1
Stand 2
Parent
Teach
Peer

*Variable abbreviations are clarified in the note to Table 8.1.

academic self-concept, and educational expectation variables as intervening between them, will permit a rather detailed analysis of within-school attainment dynamics.[2] In comparison, Sewell's class standing data pertained only to the senior year and the effects of both curriculum enrollment and academic self-concept were not assessed in his models, although the importance of the latter was suggested speculatively (Sewell, Haller, and Portes, 1969:88-89).

The causal ordering of variables in our model was dictated both by theoretical considerations and by either the time frame in which they were actually obtained or, if retrospective, to which they refer. Decisions regarding the ordering of variables measured at the same point in time were guided by the implications of specific item wording and judgments based on the import of previous school and attainment process inquiries. It will be noted that not all possible effects are included in the full model. Peer plans are assumed to affect subsequent variables only through their influences on own educational expectations[3] and the correlations between contemporaneous measures of class standing and curriculum enrollment are attributed to their mutual dependence upon other antecedant variables in the model, rather than to any direct causal relationship between them. A replication of Sewell's original model with our male sample and a detailed discussion of the rationale underlying our extended model were presented in the preceding chapter.

Our first analysis will combine male and female samples and incorporate sex explicitly into the model as an additional exogenous variable. Sex interactions will be examined within this multiple regression framework by treating sex as a dichotomous dummy variable and generating a set of interaction terms as the product of sex with every other independent variable entered into each particular regression equation. This usage of dummy variables in multiple regression analysis is formally equivalent to analysis of covariance with categorical and continuous variables (Fennessey, 1968).

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[2] Senior year data, such as those employed in Sewell's various analyses, are not well-suited for the study of educational processes during the intermediate school years, the period at which many "sorting and selecting" decisions are presumably either being made or being shaped.

[3] Since the Peer Plans Index refers more to modelling than direct encouragement, it is assumed that any peer effects on subsequent outcomes will be mediated through own college plans. Were all possible peer effects included in the analysis, only the peer plans-educational attainment path for the male sample would have been sufficiently large to be retained in the "trivial effects deleted" models. It might also be noted that measured ability is treated as dependent upon SES in this model. The implications of such a conceptualization are discussed by Hauser (1972).

It is anticipated that the well-documented sex inequality in educational attainment will be reflected in a negative effect of being female on years of education obtained. In turn, this sex disability should be manifest structurally in a reduced likelihood of enrollment in college-preparatory curricula for females and subjectively in lowered educational expectations.

No specific predictions regarding sex effects on significant others' influences, academic performance, and academic self-concept are being made, but all such effects will be included in the analysis in the hope of gaining further insight into the intrusion of sex into the educational attainment process. It is anticipated that whatever sex effects do emerge will be largely "non-functional," that is, not a consequence of sex differences in academic performance. As has already been found to be the case with the salutary influences of status background and ability variables, much of the expected depressant sex effect on educational attainments should be mediated through the various intervening school process mechanisms. Assuming that all crucial variables are included in the attainment model, any direct sex effect on educational outcomes remaining in the elaborated model may be considered a "pure" sex effect, or, if you will, an estimate of sex discrimination in the attainment process (Duncan, 1969). It should be noted that throughout the analysis estimates of sex effects will be computed with both status background and academic ability variables controlled.

Sex interactions will be examined both through the dummy variable analysis and by reanalyzing the model separately for males and females. This second strategy will suggest exactly how various attainment influences vary by sex. Our general expectation, based on Sewell and Shah's earlier work, is that status background influences will be more pronounced for the attainment outcomes of women and ability effects larger for males. We will be especially sensitive to the particular points in the school process model at which such differentials are at a maximum. As with main effects, such interactions are expected to be least consequential for academic performance variables.

Dummy Variable Analysis of Sex Main and Interaction Effects

The means, standard deviations, and interitem correlations for variables included in the school attainment process model are presented, both for the total sample and separately for each sex, in the appendix to this report.[4] We will move directly to the assessment of sex effects in the regression models computed from these data.

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[4] It will be noted that the sum of the two sex samples is twenty cases less than that of the "total sample." Twenty males not reporting current occupational status were deleted from the sex-controlled sample in order to retain comparability with other analyses in this report.

The F tests presented in Table 8.1 provide an overview of the consequences of adding sex main and interaction effects to the total sample school process model. The first six rows of Table 8.1 present the explained variance obtained for each dependent variable when various combinations of predictor variables are entered into the regression equations. The coefficients in the first row, for example, indicate the combined explanatory power of both academic ability and status background for each outcome variable. In the second row, sex is added to these regression equations, and, hence, the difference between entries for rows 1 and 2 represents the increment in dependent variable explained variance attributable solely to the sex variable. Similarly, comparisons between rows 2 and 3 indicate the consequences of adding sex interactions with both status background and academic ability to the model. This analysis is repeated in columns 4 through 6, but this time all predictor variables implied by the model in Figure 8.1 are included in the various equations.[5] The significance of these increments in explained variance is assessed in the F tests in the lower portion of the table. It should be noted that this is a conservative procedure for assessing such sex effects, since the joint explanatory power of sex covariance with other predictor variables is included in the "sex free" coefficients.

The F tests indicate a number of statistically significant main and interaction effects. Sizable sex main effects are obtained for the academic self-concept, senior class standing, sophomore class standing, and educational attainment variables. The smallest of these represents a 2 percent increase in explained variance (sophomore class standing), while the largest, that for senior class standing, reflects an almost six percent increment in variance explained. Each of these effects remains highly significant when all predictor variables implied by the attainment model are included in the various dependent variable equations. Statistically significant, though less substantial, sex main effects are obtained for the parental contact and sophomore and senior year curriculum enrollment variables. All but the last of these effects remains significant even in the full model comparison. Thus, it is already evident that sex main effects are consequential at a number of crucial points in the school process model. The exact nature of these sex "consequences" will be more evident in the discussion of the regression models to be presented shortly.

Comparing rows 2 and 3 of Table 8.1 suggests the explanatory power attributable to sex interactions with both status background and ability variables. Four such comparisons are statistically significant. The largest increment in explained variance, about 2%, is obtained for the

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[5] Due to computer storage limitations we were forced to delete one sex interaction from the analysis. Since no main teacher effects were obtained in any of our analyses, the sex-teacher interaction was chosen to be dropped.

Table 8.1

Sex Effects and Interactions in the Educational Attainment Model,[1] N = 1593

I.V.'s	Dependent Variable Explained Variance Curric I	Stand I	Peer	Teach	Parent	Ed-Ex	Image	Curric 2	Stand 2	Educ
1) APT,SES[2]	.211	.250	.222	.048	.143	.247	.156	.265	.275	270
2) APT,SES, Sex	.221	.269	.222	.049	.148	.247	.190	.269	.334	.308
3) APT,SES, Sex, Sex Interactions	.224	.270	.225	.049	.152	.253	.191	.275	.340	.326
4) Tot.Model[3]	.211	.250	.286	.096	.243	.470	.244	.491	.574	.417
5) Tot. Model, Sex	.222	.269	.286	.098	.247	.471	.263	.492	.592	.461
6) Tot. Model, Sex, Sex Interactions	.224	.270	.289	.099	.250	.476	.266	.498	.600	.479
						F Test[4]				
1 vs 2	***	***	NS	NS	**	NS	***	**	***	***
2 vs 3	NS	NS	NS	NS	NS	*	NS	*	*	***
4 vs 5	***	***	NS	NS	**	NS	***	NS	***	***
5 vs 6	NS	NS	NS	NS	NS	NS	NS	NS	***	***

[1] The abbreviations employed in the tables in this chapter refer to the following variables: APT, academic ability; SES, socioeconomic status; sex, sex; Curric 1, sophomore curriculum enrollment; Stand 1, sophomore class standing; Peer, peer college plans; Teach, teacher discussions regarding college plans; Parent, parental discussions regarding college plans; Ed-ex, educational expectations; Image, academic self-concept; Curric 2, senior curriculum enrollment; Stand 2, senior class standing; Educ, educational attainment.

[2] Unconstrained correlations and status indicators are employed in this analysis.

[3] Independent variables entered into each regression equation are those portrayed in Figure 8.1. Sex interactions with all independent variables in the regression equation are included in the interaction effect analysis.

[4] Asterisks identify the level of significance associated with each F test: *, .05 level; **, .01 level; ***, .001 level. The appropriate F ratio for such comparisons is presented in Lange (1968).

educational attainment variable. The other three significant effects, for educational expectations, senior year curriculum enrollment, and senior year class standing, each involves less than a one percent increment in variance explained, and only the last remains statistically significant in the full model comparison (which includes all possible sex interactions). While these effects are not dramatic, it is interesting that the sex interactions with ability and status background examined by Sewell and Shah (1967) are significant at a number of points in the attainment process in our analysis as well. These sex differences in ability and SES effects on various outcome variables will be documented in the separate status attainment models for males and females to be presented at the conclusion of our analysis.

While the above comparisons attest to the importance of sex effects at various points in the attainment model, they do not indicate either the direction of those effects or their magnitude relative to other attainment process influences. Such information is provided in the models to be discussed next.

Table 8.2 presents the simultaneous direct effects of status background, academic ability, and sex on each of the outcome variables in the attainment model. The table entries are standardized regression coefficients. The two coefficients of determination reported indicate the variance explained by the canonically constrained interitem correlations (those upon which the regression coefficients presented are based) and by a parallel analysis based on the unconstrained correlations.[6] Differences between the two sets of coefficients are generally negligible.

Given our large sample size, extremely modest regression coefficients would be statistically significant at conventional levels. Hence, in order to restrict our discussion to effects of some substantive importance, coefficients below .100 will be considered trivial and disregarded. Fully five of the ten sex coefficients in the reduced form models in Table 8.2 are of or above this magnitude. Interestingly, three of these coefficients indicate a salutary female effect, for class standing, both sophomore and senior, and for academic self-concept. The other influences on these dependent variables are as might be anticipated. Academic ability is clearly the dominant determinant of each, while direct status background effects are negligible. Although these coefficients are of modest magnitude, they do indicate that, even with status background and ability controlled, females are somewhat more likely to rank higher in their high school classes and, perhaps as a consequence of this rank advantage, to evaluate their academic performance and competence more highly. Thus, rather than suffering a sex-specific disability at these points in the attainment process, females actually excel in both

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[6] The first canonical correlation was highly significant at .592. The second correlation, though also significant, dropped down to .158.

Table 8.2

Total Sample Reduced Form Standardized Regression Coefficients, N = 1593

I.V.	Curric 1	Stand 1	Peer	Teach	Parent	Ed-Ex	Image	Curric 2	Stand 2	Educ.
SES	.324	.077	.407	.185	.310	.434	.033	.333	.078	.334
APT	.235	.464	.138	.042	.130	.140	.374	.295	.488	.307
SEX	-.099	.139	.023	-.033	.072	-.017	.185	-.064	.242	-.197
R^2	.218	.267	.221	.042	.144	.247	.187	.267	.333	.307
R^2 (Unconstrained)	.221	.269	.222	.049	.148	.247	.190	.269	.334	.308

academic performance and benefit from more favorable self-evaluations of that performance.

In contrast to these salutary consequences associated with being female, the negative coefficients in Table 8.2 suggest certain female-specific disabilities. With both academic ability and status background controlled, females are less likely to be enrolled in a college preparatory curriculum during the sophomore year and have lower levels of educational attainment. Although a negative female effect on senior year curriculum is suggested in Table 8.2, this coefficient falls below our .10 level for the attribution of "substantive importance." While the negative sophomore tracking and educational attainment effects are each the smallest of the three in their respective models, they clearly indicate female disabilities in the educational attainment process.

These negative effects are even more striking in light of the findings discussed above. That is, despite their higher class standing and academic self-evaluations, females are still less likely to participate in college preparatory curricula and evidence lower levels of educational attainment than males of comparable academic ability. Furthermore, even the nonsignificance of other sex-effects in Table 8.2 is of interest in view of this seeming contradiction between the higher performance but lower attainments of females. It appears that none of the significant others' influence items are directly affected by sex, nor is the educational expectations variable. While sex interactions with ability and SES in relation to expectations were significant, it is somewhat surprising, in light of the lower female attainments, that such goal orientations are not similarly depressed by sex.

It should be recalled, however, that these expressions of educational plans were elicited during the sophomore year, a time at which they might be more responsive to achievement-relevant variables such as academic ability and demonstrated performance. Thus, it might be speculated that were data obtained at a point more proximate to the high school-college transition, after more extensive reality-testing had occurred, such measures of goal orientation would be more closely sex-limited. At any rate, it appears that the female educational attainment liability is not mediated by either the various interpersonal influences or goal orientation variables tapped in this analysis. The fact that no such depressant effects offset the female advantage in terms of both academic performance and self-conceptions suggests that the depressant female effect on educational attainments is largely direct and unmediated.

The pattern of influences reflected in these reduced form models has already prompted us to speculate about the relationships among these outcome variables themselves. However, such speculation is unnecessary, since the full attainment model, including all variables in Tables 8.1 and 8.2, is evaluated in Tables 8.3 and 8.4. The model in Table 8.3 includes all effects implied in Figure 8.1, while that in Table 8.4 deletes

Table 8.3

Standardized Regression Coefficients for Total Sample Full Attainment Process Model,[1] with Constrained Correlations, N = 1593

I.V.	SES	APT	Curric 1	Stand 1	Peer	Teach	Parent	Ed-Ex	Image	Curric 2	Stand 2	Educ
Moth Ed[2]	.258											
Acquis.	.409											
Fath Ed	.330											
Fath Occ	.275											
SES		.318	.324	.077	.323	.114	.207	.186	-.011	.114	.017	.156
SEX		.030	-.100	.139	.024	-.036	-.070	-.031	-.143	-.040	.142	-.226
APT			.235	.464	.014	-.071	-.030	-.019	.226	.125	.179	.084
Curric 1				*	.224	.186	.268	.208	.023	.414	.025	.076
Stand 1					.154	.148	.208	.100	.295	.095	.511	.088
Peer						*	*	.284	*	*	*	*
Teach							*	-.017	-.031	-.028	-.027	-.003
Parent								.196	.032	.074	.001	0.0
Edex									.024	.148	.030	.144
Image										0.0	.166	.009
Curric 2											*	.214
Stand 2												.159
R^2	1.00	.102	.218	.267	.284	.091	.243	.469	.258	.492	.592	.460
R^2 (Uncon.)		.105	.222	.269	.286	.098	.247	.471	.263	.492	.592	.461

[1] Asterisks indicate "upper triangle" coefficients not computed in the attainment model

[2] Status background indicator abbreviations are: Mother Ed, mother's education, Acquis, acquisition index; Fath Ed, father's education; Fath Occ. father's occupation.

Table 8.4

Standardized Regression Coefficients For Total Sample Attainment Process Model
With "Trivial" Paths Deleted, N = 1593

I.V.	SES	APT	Curric 1	Stand 1	Peer	Teach	Parent	Edex	Image	Curric 2	Stand 2	Educ
Moth Ed	.258											
Acquis	.409											
Fath Ed	.330											
Fath Occ	.275											
SES		.318	.324		.325	.102	.203	.183		.119		.174
Sex			-.100	.138					.142		.138	-.238
Apt			.235	.488					.235	.126	.194	
Curric 1					.222	.180	.253	.209		.427		
Stand 1					.164	.112	.209	.086	.307	.095	.519	
Peer								.282				
Teach												
Parent								.182				
Edex.										.169		.167
Image											.169	
Curric 2												.272
Stand 2												.261
$\bar{R}^2$	1.00	.101	.218	.262	.284	.086	.238	.469	.256	.487	.590	.446
R^2 (Uncon.)		.104	.222	.262	.286	.093	.243	.470	.256	.488	.590	.447

coefficients found to be trivial. Our discussion will center on the results in Table 8.4. Moreover, since the prominent features of a version of this model, extended to include occupational attainment variables, were discussed in previous chapters, we shall restrict our attention to sex effects in the analysis.

All five significant sex effects observed in the reduced form models are reflected in this full model as well. While these full model regression equations have, in most instances, resulted in considerable increment in dependent variable explained variance and redistributed much of the effects previously accorded to ability and status background among various mediating mechanisms, only the senior class standing and educational attainment sex effects are appreciably affected by these elaborations. The reduction in the direct senior class standing sex effect is largely attributable to the mediation of self influences through sophomore year class rank. This indirect sex effect would be .072. The large direct effect of sophomore standing on senior standing, of course, reflects performance continuity and is to be anticipated; yet it is also interesting to note the number of direct influences on senior class standing independent of this sophomore-senior linkage. The direct aptitude, sex, and self-concept effects on senior class rank suggest the frequent "late blossoming" of academic talent. Furthermore, the modest indirect effect of academic self-concept on educational attainment mediated through the senior rank variable indicates the role of such subjective self-evaluations in the attainment process (Sewell, Haller, and Portes, 1969).

Turning now to the negative sex effects, it might be noted that the depressant sex effect on educational attainment in Table 8.4 is actually larger than that observed in the reduced form model, having increased from -.197 to -.238. Indeed, this sex effect is the third largest of the direct influences on educational attainment, exceeding those for both status background and educational expectations. This increment over the reduced form sex coefficient reflects the compensation for the salutory sex effects on educational attainment mediated through the senior class standing and academic self-concept variables. The negative sex influence on sophomore curriculum enrollment, at -.100, is essentially unchanged from the reduced form model.

Indeed, while the sex coefficients for the sophomore class standing, sophomore curriculum enrollment, and academic self-concept variables are all similar to those in the reduced form models, the full model does indicate modest indirect sex influences on other outcomes. The mediated sex effect on senior class standing through the academic self-concept index, for example, would be .024. Also, it appears that at least a part of the sex influence on academic self-concept is a function of the higher sophomore class standing of females. This indirect effect would be .042. Finally, the modest indirect sex effects on each significant other influence item, through both sophomore curriculum and class standing, would be largely self-cancelling (since the former is negative and the latter positive).

Before concluding our discussion of sex effects in the school process model, an observation regarding the robustness of these effects is in order. While the direct female disadvantage in terms of actual years of education obtained would be somewhat offset by indirect salutory sex effects mediated through the senior rank and self-concept variables, the reduced form sex coefficient indicates that the net sex-effect is negative, of modest magnitude, and highly significant. Not obvious in our data presentations, however, is the fact that such effects would not be offset by sex covariance with either academic ability of socioeconomic status. Since sex is essentially uncorrelated with both variables, with respective zero-order sex correlations of .028 and -.006, the net indirect sex effect through them is negligible, being but .006 (computed from the reduced form coefficients and taking into account the dependence of academic ability upon status background implied by our model).

Thus, our assessment of sex main effects in the attainment process model has produced both anticipated and unanticipated results. While the depressant female effect on educational attainments had been expected, it was assumed that much of this effect would be mediated through school process variables. The only such mediation obtained, however, involved a modest reduction in the likelihood of enrollment in college preparatory curricula for females. Moreover, the resiliancy of this direct depressant sex effect is even more remarkable in light of the female advantage in terms of both academic performance and self-concept. That these academically pertinent female advantages are far outweighed by the direct attainment liability highlights the significance of this sex-specific disability. It must be emphasized that this direct negative sex effect on educational attainments is manifest even when academic ability, performance, curriculum enrollment, self-concept, educational goals, and significant others' influences are all simultaneously controlled. The implications of these findings will be considered further in our summary and discussion, but first we will conclude the analysis by examining further some of the sex interactions found to be significant in the dummy variable analysis.

Within-Sex Reduced Form and Full Models

Following Sewell and Shah (1967), we shall explore sex interactions with both academic ability and status background in relation to various school process outcomes, reanalyzing our model separately for males and females. Our preliminary analysis indicated four such significant interactions, for the senior class standing, senior curriculum enrollment, educational expectations, and educational attainment variables. Table 8.5 presents the "within-sex" reduced form models involving ability and status background for each of these dependent variables, as well as for the other outcome variables in the school process model. Since variable variances differ somewhat by sex, both standardized and unstandardized

Table 8.5

Constrained and Unconstrained Reduced Form Models, with both Standardized and Unstandardized Regression Coefficients, by Sex

	Males (N = 719)					Females (N = 854)				
	SES		APT		R^2	SES		APT		R^2
	Stand.	Unstand.	Stand.	Unstand.		Stand.	Unstand.	Stand	Unstand.	
Curric 1	.298	.092	.269	.034	.221	.350	.131	.204	.024	.203
	.301[1]		.271		.223	.358		.208		.210
Stand 1	.072	.038	.462	.100	.244	.085	.053	.474	.094	.254
	.085		.457		.245	.107		.470		.258
Peer	.358	.346	.156	.063	.194	.448	.579	.132	.054	.250
	.362		.164		.199	.448		.133		.251
Teach	.178	.067	.041	.006	.039	.185	.088	.046	.007	.041
	.201		.047		.048	.202		.053		.048
Parent	.296	.121	.162	.028	.150	.318	.161	.105	.017	.131
	.322		.168		.167	.321		.108		.134
Edex	.373	.192	.213	.046	.244	.476	.329	.080	.018	.254
	.374		.218		.246	.478		.081		.256
Image	.036	.018	.380	.077	.156	.033	.022	.385	.080	.156
	.081		.387		.162	.069		.387		.160
Curric 2	.292	.088	.358	.045	.291	.376	.140	.242	.029	.250
	.300		.364		.294	.380		.246		.254
Stand 2	.052	.043	.547	.187	.323	.101	.100	.468	.142	.255
	.066		.551		.325	.128		.465		.261
Educ	.302	.302	.374	.155	.315	.397	.398	.232	.074	.262
	.310		.371		.319	.400		.230		.264
	College-Goers									
Educ	.152[1]		.305		.092	.100		.184		.052

[1] Sheaf coefficients based on unconstrained correlations appear in the second row of coefficients for each dependent variable. Only sheafs are used in the reduced form model for college-goers.

regression coefficients are included in the table.[7] Comparing across sexes, the only reversal in the relative magnitude of corresponding standardized and unstandardized coefficients occurs for the sophomore rank item, a variable for which sex differences are negligible anyway. Since the import of both sets of coefficients is the same, we will restrict our discussion to the somewhat more intuitively interpretable standardized coefficients.

Also presented in Table 8.5 are the standardized status (sheaf) and ability coefficients computed from the unconstrained correlation matrices.[8] It appears that the coefficients and proportions of explained variance derived from both the constrained and unconstrained correlations are generally quite similar in both magnitude and implication. The largest discrepancies occur for the academic self-concept variable, but even in this instance both sets of coefficients similarly fall below our standard for inputting substantive significance (.10). Since these discrepancies can be considered minor, we will again refer primarily to constrained coefficients in our discussion; however, only unconstrained effects are reported for the model based on college-going youth included at the bottom of Table 8.5. In this instance, the canonical analysis for both samples of college-going youth generated second-order correlations that exceeded the .25 level. Hence, only the sheaf construction strategy was employed in this analysis.[9]

Since there is no formal statistical standard for imputing substantive importance to these between-sex differences in coefficients, we will employ an arbitrary standard similar to that applied earlier. Differences of approximately .10 or greater will be treated as notable. It is evident that a number of the comparisons in Table 8.5 meet this standard, although the statistically significant interactions for senior class standing do not. The nature of the differences in every comparison for which the standard is met is consistent with Sewell and Shah's (1967) results: ability influences are larger for males, and status effects larger for females. This difference is reflected in the coefficients for the educational expectations, senior curriculum enrollment, and educational attainment variables. In the last instance, for example, our results are quite similar to Sewell and Shah's: For women the status background and ability coefficients are .397 and .232, respectively; for males their relative magnitude is reversed, with respective coefficients of .302 and .374.

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[7] In order to compute unstandardized coefficients for the models including the unmeasured SES construct, SES was assigned the mean and standard deviation of the educational attainment variable.

[8] The first and second canonical correlations for the male sample were .586 and .240. The respective correlations for the female sample were .612 and .74.

[9] The first and second canonical correlations for the analysis involving college goers were: males, .390 and .298; females, .432 and .319.

Thus, these data replicate the previously documented sex ability and SES interactions with regard to both educational expectations and actual attainments. Furthermore they indicate a similar such interaction with regard to senior year curriculum tracking. Clearly, then, status ascription is more important for the educational outcomes of females, while males are somewhat more successful in converting academic ability into educational payoffs, (it should be noted that the previously discussed female advantage in terms of educational performance, not attributable to measured ability, is controlled in this comparison.) Given the prominence of both sex and ability effects in our various models, it is apparent that universal achievement standards are not the sole factors pertinent either directly to educational attainment or to the processes leading to such attainment.[10] While it would be informative to explore these issues further by evaluating the interrelationships among the intervening school process variables themselves for each sex, such comparisons would necessarily be rather lengthy and will be deferred for another time.

Finally, in Table 8.5, the reduced form educational attainment models for our subsamples of college-goers may be compared with the corresponding total sample models. For both sexes, both ability and SES influences are somewhat attenuated in the college-level models, with the latter diminishing considerably more than the former. While the SES effects that do remain are quite similar for both males and females, ability effects continue to reflect the sex differential noted in the total sample models. Thus, the importance of academic ability for educational attainments is somewhat greater for college-going males than females. These coefficients are, respectively, .305 and .184.

These data, then, lend but partial support to the conclusions of both Sewell and Shah (1967) and Wolfle (1954) regarding status attainment influences given selection into college. In this analysis, status background main effects are considerably diminished for the college-going population; but ability main effects are also somewhat attenuated, and ability-sex interactions remain robust. The discrepancies between Sewell's data and our own are not immediately explicable, but they do suggest that, just as earlier pronouncements may have slighted the continuing importance of status background for college attainments (Eckland, 1964; Sewell and Shah, 1967), so too may certain sex-specific disabilities carry over into the collegiate setting. While the results presented here are far from definitive in this regard, they certainly suggest that such topics merit further consideration.

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[10] The absence of certain direct effects in these reduced form models also merits note in this context. These data do not indicate any SES biases in either sophomore or senior class standing and no direct status effect on academic self-evaluations.

Finally, in Tables 8.6 through 8.9, we have presented the full attainment models, for males and females separately, with and without the trivial paths deleted. The different effects of ability and SES by sex at each point in the attainment process are essentially unchanged from those already noted in Table 8.5. In most other respects the manner in which males and females generally are processed through the educational system does not appear to differ substantially in these models.

Summary and Conclusions

Our primary interest in this analysis involved the assessment of sex effects, both main and interaction, in an elaborated school process attainment model. We began with the assumption, amply documented by previous research, that females would suffer an educational attainment disability. We further assumed that, just as has been found to be the case with status background and ability variables, much of this effect would be mediated through the various intervening school process variables. In particular, it was anticipated that this sex-specific liability would be reflected in a reduced likelihood of enrollment in college-preparatory curricula and lower levels of educational expectations for women.

In addition to assessing these main effects, we also examined sex interactions with both status background and academic ability in relation to the various attainment process outcomes. Following Sewell and Shah (1967), it was anticipated that status ascription would be more pronounced with regard to both the educational expectations and actual attainments of females, while the corresponding outcomes for males would be more strongly dependent upon the "functionally-relevant" influence of academic ability. In addition to replicating these interaction effects, we also explored their consequences for the other school process variables included in our model.

We began with a summary assessment of the significance of dependent variable explained variance that could be attributed to the addition of sex main and interaction effects to the "sex-free" attainment model. Our strategy involved incorporating sex directly into the multiple regression analysis as a dichotomous dummy variable and generating a set of sex inter-action terms as the product of sex with each other independent variable included in the equation. The use of such categorical main and interaction effects in multiple regression analysis is formally equivalent to analysis of covariance with categorical and continuous data.

A large number of statistically significant sex main effects were obtained when sex effects were added to those of academic ability and status background in the various reduced form models. The increment in explained variance attributable to sex was statistically significant for the following dependent variables: sophomore and senior year class standing;

Table 8.6

Standardized Regression Coefficients for Full Attainment Process Model,
With Constrained Correlations, For Males

I.V.'s	SES	APT	Curric 1	Stand 1	Peer	Teach	Parent	Edex.	Image	Curric 2	Stand 2	Educ.
Moth Ed	.202											
Acquis.	.464											
Fath Ed	.257											
Fath Occ	.348											
SES		.372	.298	.072	.280	.103	.197	.166	.006	.100	.014	.148
Apt			.269	.462	.030	-.096	-.020	.044	.235	.147	.257	.125
Curric 1					.228	.212	.277	.170	-.011	.458	.044	.095
Stand 1					.140	.174	.232	.111	.307	.132	.500	.155
Peer								.240	*	*	*	*
Teach								.006	.005	.022	-.020	-.019
Parent								.207	-.016	.043	-.020	.018
Edex									.041	.076	-.018	.171
Image										.006	.144	-.003
Curric 2												.144
Stand 2												.114
R^2	1.00	.139	.221	.244	.256	.105	.265	.443	.231	.528	.559	.462
R^2 (Uncon)		.148	.224	.245	.262	.114	.280	.447	.238	.530	.562	.468

Table 8.7

Standardized Regression Coefficients for Attainment Process Model
With "Trivial" Paths Deleted, For Males

I.V.'s	SES	APT	Curric 2	Stand 1	Peer	Teach	Parent	Edex	Image	Curric 2	Stand 2	Educ
Moth Ed	.202											
Acquis.	.464											
Fath Ed	.257											
Fath Occ	.348											
SES		.372	.298		.286	.103	.193	.174		.132		.157
APT			.269	.489		-.096			.241	.149	.268	.131
Curric 1					.233	.212	.274	.178		.496		
Stand 1					.152	.174	.224	.129	.313	.163	.493	.154
Peer								.243				
Teach												
Parent								.208				
Edex.												.192
Image											.143	
Curric 2												.194
Stand 2												.112
R^2	1.00	.139	.221	.239	.256	.105	.264	.441	.229	.520	.557	.457
R^2 (Uncon.)		.148	.224	.245	.262	.114	.280	.447	.238	.530	.562	.468

Table 8.8

Standardized Regression Coefficients For Full Attainment Process Model
With Constrained Correlations, For Females

I.V.'s	SES	APT	Curric 1	Stand 1	Peer	Teach	Parent	Edex	Image	Curric 2	Stand 2	Educ
Moth Ed	.314											
Acquis.	.344											
Fath Ed	.372											
Fath Occ	.239											
SES		.276	.350	.085	.357	.117	.211	.192	-.024	.121	.017	.194
Apt			.204	.474	.013	-.046	-.034	-.067	.231	.115	.129	.029
Curric 1					.220	.163	.263	.223	.046	.372	0.0	.057
Stand 1					.157	.125	.181	.088	.292	.063	.545	.021
Peer								.320	*	*	*	*
Teach								-.027	-.065	-.074	-.026	.016
Parent								.190	.074	.100	.011	-.032
Edex.									.008	.215	.068	.117
Image										-.010	.195	.030
Curric 2												.297
Stand 2												.195
R^2	1.00	.076	.203	.254	.314	.078	.219	.495	.234	.478	.575	.438
R^2 (Uncon.)		.082	.210	.258	.316	.085	.220	.496	.240	.480	.578	.442

Table 8.9

Standardized Regression Coefficients For Attainment Process Model
With "Trivial" Paths Deleted, For Females

I.V.'s	SES	APT	Curric 1	Stand 1	Peer	Teach	Parent	Edex	Image	Curric 2	Stand 2	Educ
Moth Ed	.314											
Acquis.	.344											
Fath ed	.372											
Fath Occ	.239											
SES		.276	.350		.359	.111	.208	.185		.116		.203
Apt			.204	.497					.241	.140	.137	
Curric 1					.221	.157	.258	.230		.368		
Stand 1					.163	.105	.166		.307		.562	
Peer								.326				
Teach												
Parent								.191		.079		
Edex										.224		.121
Image											.200	
Curric 2												.324
Stand 2												.235
R^2	1.00	.076	.203	.247	.314	.076	.218	.488	.226	.471	.469	.433
R^2 (Uncon.)		.082	.210	.247	.316	.085	.222	.489	.226	.472	.569	.438

sophomore and senior year curriculum enrollment; academic self-concept; parental contact regarding college plans; and actual educational attainments. When sex interactions with both academic ability and status background were added to the equations, the additional increment in explained variance was significant for four of the school process variables: senior class rank; senior curriculum enrollment; educational expectations; and educational attainments. Most of these sex effects remained significant even when all effects implied by the full attainment model (including sex interactions) were included in the various regression equations.

While these tests of significance clearly indicate the intrusion of sex into the attainment process at a number of points, they are not at all informative with regard to either the direction or magnitude of such effects. Path analysis was employed to provide some substance to the discussion of these statistically significant sex effects.

We began by examining the reduced form path models for each of the outcome variables in the school process model. In each instance, sex, academic ability, and socioeconomic status were employed as the predictor variables in the regression equations. This analysis revealed notable sex effects for five of the school process variables: sophomore and senior class rank; academic self-concept; sophomore curriculum enrollment; and educational attainment. In the first three instances the sex effects were sizable, in each case exceeding their corresponding status coefficients. Furthermore, each of these paths was positive, indicating a salutary effect of being female on both academic performance and self-concept, even with academic ability controlled. In light of these positive female effects, the negative coefficients obtained for both curriculum enrollment and educational attainment were even more striking. While these sex effects were both the smallest of the three for their respective dependent variables, the double disability suffered by females, as suggested by the previous findings, is rather dramatic: despite controlling for academic ability and status background, and despite an advantage in terms of both performance and self-evaluations in relation to males of comparable ability and social origin, females are still somewhat less likely to enroll in college-preparatory curricula and evidence lower levels of educational attainment.

We next proceeded to incorporate sex into the full attainment process model in order to explore the mechanisms by which these sex effects were actually transmitted. It turned out, however, that the direct sex effect on academic attainment was actually larger in the full model than in the reduced. The modest increment in this negative sex effect reflected a compensation for the salutary indirect sex influences on educational attainment mediated through the female self-concept and class rank advantages. The other mediated sex effects were all rather modest and as would be anticipated: sex had an indirect effect on senior class standing through sophomore rank, had a modest depressant influence on senior curriculum enrollment through sophomore enrollment, and affected senior class rank through the self-concept variable as well. Finally, the mediated sex effects on each of the three significant others' influence variables were largely self-cancelling, with that through curriculum enrollment being negative and that through class rank being positive.

Thus, while we have indeed documented some of the dynamics by which sex effects are mediated in the school process model, the most significant feature of the full model remains the direct, unmediated depressant sex effect on actual educational attainments. The effect is evidenced despite simultaneous controls on a large number of variables pertinent to educational attainments: academic ability, performance, status background, educational goal orientations, academic self-concept, curriculum enrollment, and the influences of various significant others (parents, teachers, and peers). The fact that such school process variables, subjective, interpersonal, and institutional, do not account for the female educational attainment disability indicates a rather remarkable robustness for this sex liability.

It would thus appear that further attempts to specify the dynamics of such sex-specific consequences for educational attainment will either have to move outside the school process framework and/or examine institutional practices not explored in this model. Possibly the inclusion of other goal orientation or motivation variables (perhaps, for example, pertaining to marital interests) would further elucidate the model, but it is quite clear that the educationally-relevant variables examined here, including measures of academic plans and self-evaluations, do not account for this sex liability. Thus, we seem to have documented a relatively "pure" sex effect, one which is not explicable in terms of the numerous mechanisms conventionally thought to mediate most antecedant influences on eventual educational attainment. It would appear, then, that the explanation of this sex liability must lie in areas outside the purely academic. Whether these factors are ultimately found to involve sex role socialization or institutional discrimination, it is clear from these data that universal achievement standards are far from the sole determinants of one's fate in the stratification process.

The results of the analysis of sex interactions with ability and status background serve to reinforce this conclusion. Sewell and Shah's finding (1967) that status influences were more consequential for the educational expectations and attainments of women, while ability effects were more important for men was replicated with our data. In addition, similar sex differences were noted for the senior year curriculum enrollment and class rank variables, with sex differences for the latter being the smallest of the four. Thus, the relative importance of these background factors for various outcomes in the school process model appears also to be sex-linked. In every comparison, female outcomes were more strongly status ascribed.

We also assessed ability and status effects on educational attainment for only those youth in our sample who attended college. While status effects were quite similar for both sexes in this analysis, academic ability remained considerably more important for the educational attainments of males. It appears, then, that while some of the sex interactions with ability and SES are spent in the high school-college transition, they are not entirely dissipated with selection into college. These results are somewhat at odds with those obtained by Sewell and Shah (1967), and suggest that the intrustion of sex effects into the collegiate educational attainment process merits further consideration.

CHAPTER 9

HIGH SCHOOL CONTEXTUAL EFFECTS[1]

The full and reduced path models for our total school contextual variables are presented in Tables 9.1 and 9.2. The inter-item correlation matrix for the variables in this model is included in Table 7.2. The zero-order correlations from Table 7.2 would be the appropriate coefficients linking the exogenous variables in our models. Due to space limitations these correlations are not included in the path model per se. Our contextual variables, school average aptitude (Con 1) and average level of father's education (Con 2), correlate .648. This is quite comparable to Meyer's correlation of .69 (1970: 63) for two similar contextual variables employed in an analysis of the original 1955 senior sample. In Meyer's study school social class composition was measured as the proportion of seniors in the school falling into the highest two quintiles of a composite family status index, while student body academic competitiveness was measured, as in our study, as the within school average aptitude score.

The development of our model of contextual influences focused primarily on academic self-concept and educational goals as dependent variables. Despite the fact that the self-concept index itself was found to have no impact on subsequent variables in our model, our conceptualization of the dynamics of contextual effects in the attainment process anticipates the following: the direct effect of contextual variables on academic self-evaluations will be minimal; and the somewhat offsetting influences of social status and competitive school environments will be mediated through peer plans and academic performance respectively. That is, the more academically competitive the student body, the lower an individual's relative performance will be at a given level of individual aptitude. Thus, a high aptitude student body will depress relative performance scores which, in turn, should affect both academic self-concept and level of educational expectations. Ability contextual effects which are not mediated through performance scores should have positive consequences for our dependent

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[1] The analysis of contextual effects in Chapters 9 and 10 represents only preliminary results. It also should be noted that this analysis is restricted to males only. This work is being revised to include a canonical analysis strategy in the treatment of the status background indicators.

TABLE 9.1

FULL MODEL HIGH SCHOOL ATTAINMENT PATH COEFFICIENTS WITH SCHOOL-WIDE CONTEXTUAL VARIABLES, FOR MALES

Independent Variables	Dependent Variables								
	Peer	Stand 1	Par-ent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
Occ 1									.216
Educ 1								.514	.504
Ed Ex							.177	-.027	-.007
Imag 2						.047	.030	.037	.017
Teach					-.010	.058	-.019	.025	-.018
Parent					.008	.232	.037	.016	.050
Stand 1			.271	.204	.294	.109	.243	.116	.037
Peer		.169			.001	.275	.133	.050	.017
Apt	.182	.439	.049	-.025	.271	.074	.178	.046	.031
Con 1	-.134	-.115	-.056	-.069	-.099	-.005	-.007	-.049	-.002
Con 2	.229	-.051	.066	.081	-.031	-.023	.084	.075	-.002
SES	.291	.115	.290	.187	.092	.212	.157	.107	.141
R^2	.226	.292	.228	.094	.249	.438	.453	.487	.591

"A" Coefficient For:	Peer	Stand 1	Par-ent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
S1	.378	-.497	.227	.300	1.13	.302	.083	-.160	.573
S2	.230	.070	-.155	-.241	-.173	.514	.815	.713	.085
S3	.031	.514	.282	.054	-.488	.146	.287	-.450	.403
S4	.484	.279	.802	.723	.141	.170	.140	.816	-.354
S5	.264	.619	-.048	-.171	.249	.260	-.331	-.310	-.375
S6	-.065	.035	-.014	.412	-.173	-.085	-.102	.113	.566

variables by establishing an academically oriented milieu in which scholarly pursuits are, presumably, encouraged and rewarded. It is also likely that the aptitude context will influence positively the likelihood of having academically oriented close peer role models. Social status composition of the student body, on the other hand, should have largely salutary mediated influences on self-concept and educational goals by influencing the likelihood

TABLE 9.2

REDUCED MODEL HIGH SCHOOL ATTAINMENT PATH COEFFICIENTS WITH SCHOOL-WIDE CONTEXTUAL VARIABLES, FOR MALES

Independent Variables	Dependent Variables								
	Peer	Stand 1	Parent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
Occ 2									.234
Educ 1								.546	.542
Ed Ex							.182		
Parent						.251			
Stand 1			.292	.195	.294	.151	.247		
Peer		.162				.284	.151		
Apt	.182	.441			.275		.190		
Con 1	-.134	-.142			-.112				
Con 2	.229								
SES	.295	.109	.315	.196		.222	.183	.135	.122
R^2	.226	.289	.234	.089	.240	.432	.476	.479	.585

"A" Coefficient For:	Peer	Stand 1	Parent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
S1	.373	-.515	.213	.286		.297	.087	-.065	.473
S2	.227	.064	-.124	-.240		.509	.697	.546	.628
S3	.030	.515	.292	.035		.171	.294	-.291	-.106
S4	.478	.193	.791	.740		.153	.300	.852	-.302
S5	-.064	.699	-.064	-.190		.261	-.349	-.313	-.384
S6	.261	-.009	-.003	.424		-.086	-.071	.153	.645

of having college-oriented peers. We also speculated that there might be a modest residual status context effect on performance due to limitations in the adequacy of our Peer Plans Index. Nevertheless, the bulk of status context influences on subsequent outcomes was hypothesized to operate through their direct effects on peer plans.

Thus, both contextual variables are assumed to have their major influence on academic self-concept and educational goals through a two-stage process: with higher aptitude contexts operating to depress relative performance scores; and, with higher status contexts increasing the likelihood of having college-oriented peer friends. In the discussion of our full model we have already observed that the Peer Plans Index is unrelated to academic self-concept. Consequently, the hypothesized indirect status composition effect on self-concept through peer plans can be rejected without even inspecting the contextual variable data. The Peer Plans Index, however, did have direct paths to both sophomore performance and educational expectations, so that these anticipated indirect status composition influences remain to be examined. We will turn first to our analysis of contextual effects for the school-wide student body composition measures.

School-Wide Contextual Effects

Table 9.1, which includes all the total school contextual variable paths, is provided primarily for the reader's inspection.[2] Most of our discussion will pertain to the reduced model in Table 9.2. Table 9.1 does reveal, however, that while most of the direct context variable paths are insignificant, as anticipated, those social origin effects that are in the .060 to .090 range are all positive. Somewhat surprisingly, however, all of the aptitude context paths, whether significant or not, are negative. This contradicts our expectations, since we had anticipated the average aptitude-academic performance effect to be the only negative contextual influence. We will return to this point shortly.

The reduced form coefficients in Table 9.2 indicate that the significant contextual paths appear largely where anticipated, although in two of the four instances the direction of effect is opposite that hypothesized. The magnitude of these four path coefficients are all quite modest, ranging between -.112 and .229. In the formulation of our model of contextual influences in Chapter 2 we postulated that all such effects, if noted at all, should be quite modest. Consequently, the size of these direct effects is not surprising.

Beginning first with the mediated contextual effects in the model, we can note that the average academic aptitude influence through academic performance is exactly as anticipated. The direct path from the aptitude context measure to the sophomore class standing item is -.142, thereby reflecting the hypothesized depressant effect on grades with increasing academic ability of the student body. Consequently, there is a modest depressant indirect influence of ability context through performance on both academic self-concept and educational expectations. These indirect paths are, respectively, -.042 and -.026. Actually, indirect negative effects of similar magnitude are also reflected in these data for parental and parent-teacher contact, years of education obtained, and first occupational status. Thus, although such influences might be modest indeed, they certainly are of substantive interest. At the same time, the direct effect of individual academic aptitude on performance is raised ever so slightly, from .422 to .442, when the suppressant influence of ability context is removed from the model. The explained variance for academic performance in the full attainment also increases slightly, from .272 to .292.

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[2] Although not included in any of the tables, academic aptitude and father's education squared and cubed were added as variables to each model and the paths rerun. This was done to test for nonlinearity in aptitude and education influences. No such non-linear effects were noted. Had they been significant, we then would have had to cope with the question of whether non-linear individual--contextual variable difference scores would add any explanatory power over the linear effects of the individual variables. Since this non-linearity test resulted in no appreciable additional explained variance and had little affect on the distribution of linear effects in the model, these analyses will not be discussed further.

While the model excluding the contextual variable is the more parsimonious of the two, the theoretical issue of an accurate representation of reality cannot be resolved by such equivalence of numbers. The fact that we have successfully predicted a negative contextual influence with our conceptualization strains the opposing argument that the contextual variable actually subsumes uncontrolled individual level variation (Hauser, 1970). Since essentially all of our individual level effects on academic performance are positive, it is unlikely that any of them could account for such a depressant contextual influence. It seems that our distinction between salutary social origins effects and depressant competitive ones provides results that are difficult to account for with an "uncontrolled individual level variation" alternative explanation. Most other substantively similar studies of contextual effects in educational settings employed a single contextual variable with a positive influence hypothesis. Consequently, the argument that variations in individual level variables left uncontrolled and operating in the same direction with regard to the dependent variable actually account for contextual effects was quite tenable. But such does not seem to be the case in this instance. Similar negative contextual effects have been documented in a number of other studies (Davis, 1966; Meyer, 1970; Spaeth, 1968, 1970; Nelson, 1972; Drew and Astin, 1972; Werts and Watley, 1969). With depressant effects predicted for the contextual variable and salutary influences likely for the individual level variables we approximate what Stinchcombe (1968) has designated a "crucial experiment." With a negative contextual effect observed empirically, modest as it is, it would seem that we can have considerable confidence in the model which predicts it.

The social origins composition influence on the Peer Plans Index is also as anticipated. The school-wide average father's education measure has a moderately strong positive path to the item pertaining to the educational plans of close peers. This effect is as hypothesized and implies an indirect salutary status context influence on educational expectations, years of education obtained, and academic performance. The values of these indirect paths are .055, .035, and .037 respectively.

At the same time, however, the average aptitude score also has a modest negative path to the Peer Plans Index. It will be recalled that we had anticipated, if anything, a positive effect for this path, thinking that the higher the aptitude level of the student body, the more likely one is to have peers with college-going intentions. Our substantive explanation of this effect is necessarily conjectural, but an interpretation that is consistent with most of our preceding and subsequent analyses can be set forth. If it can be assumed that the salutary influence of social origins composition and the depressant effects of the competitiveness of the student body are operative as postulated, it would seem that not all of the latter are mediated through relative performance scores. Although grades probably constitute the major formal criteria by which the student assesses his relative competence, it can be assumed that numerous other cues are available in the classroom setting to influence his self-evaluation. Such things as the relative quality of others' class participation, the teacher's distribution of encouraging remarks, peers' own comments regarding one another's ability, and so forth all serve to provide feedback regarding one's own academic worth. The more academically competent the student body, the more likely that all of these cues will serve to depress one's self-evaluation, beyond the influence through objective performance scores. The direct negative aptitude context-self-concept path in Table 9.2 supports these assumptions.

We must assume, then, that most of the peer referents in the Peer Plans Index are in the same class or school and, consequently, subject to the same depressant aptitude contextual effects, both direct and through performance scores. Consequently, for peer friends also, the higher the aptitude context, the lower the academic self-concept, etc., all other things being equal. Thus, while social status context influences increase the likelihood of having college-oriented peers, just as individual status effects increase own college-going plans, more competitive environments serve to offset this salutary influence somewhat. The positive social origins influence is almost double the depressant effect of aptitude composition, indicating a net positive effect of school composition on peer plans. The indirect social origins contextual effects through the Peer Plans Index are .037, .055, and .035 for academic performance, educational expectations, and educational attainments respectively. The net contextual effects through peer plans would be about half these social origin influences when the indirect negative aptitude paths are subtracted out.

If our somewhat strained interpretation of the negative aptitude contextual influence on peer plans is not satisfactory, it can be omitted from the model, thereby reducing the social origins path and resulting in essentially the same net contextual influence. When this is done, the social origins contest path drops from .229 to .145 (not shown in table). This being the case, both parsimony and substantive meaningfulness probably argue for the omission of this path. In any case, we find once again that the addition of the contextual variables adds little overall explanatory power to the model.

Finally, we can note the modest, unanticipated direct negative path from aptitude context to academic self-concept. Although we had originally postulated that all depressant aptitude influences would be mediated through performance measures, this direct effect has caused us to reassess our thinking. As had just been indicated above, it would seem that there are a number of non-performance relative ability cues which can affect the conception of one's own ability. Thus, although our mediation hypothesis is supported by these data, there is an indication that not all the negative influence of the competitive environment is indirect. Rather, we find evidence of both mediated and direct depressant student body aptitude composition effects. Drew and Astin (1972: 1157), on the other hand, found that all of their depressant influence of college selectivity on self-concept at the college level was mediated through performance scores (which, as we shall see, is also the case in our college-level analysis). Nevertheless, if our interpretation of these results is valid, it would seem that our original thinking slighted the importance of relative ability indicators other than objective performance evaluation through the formal grading system.

Aside from this unanticipated effect, which, post facto, seems quite consistent with our conceptualization of contextual influences, and the somewhat more perplexing negative path from average school aptitude to peer plans, the results of this first contextual analysis are largely supportive of the contextual effect model. This is particularly true of the proposed separability of, and differing effects for, the aptitude and social status dimensions of the high school student body composition. A number of other recent studies have indicated the desirability of a multivariable model of contextual influences quite consistent with the one developed here.

Nelson's (1972: 147) study of Milwaukee high school seniors reached similar conclusions regarding the differential influence of contextual variables at various points in the attainment process: " . . . the associations suggest the following: that the effects of school status on aspirations are being cancelled out by the negative indirect effects of school status on aspirations related through rank placement."

Our analysis points to a quite similar process of at least partially off-setting influences. However, we would conclude that the social status effects on aspirations are also indirect, being mediated through variables unmeasured in Nelson's study, while his depressant status effect on rank is actually a function of aptitude composition. Similarly, Drew and Astin (1972) urge the merger of relative deprivation and environmental press contextual models to account more fully for the complexity of these processes. Again, their conceptualization closely approximates ours, particularly noting the offsetting influences of selectivity, being directly salutary on aspirations and indirectly negative through GPA. In their case, however, both effects are attributed to aptitide composition. Neither Nelson nor Drew and Astin clearly distinguish between status and aptitude composition effects. Indeed, each focuses on a different dimension, yet reaches exactly the same conclusion regarding their effects. Our analysis indicates the merit of such a distinction, and that differential consequences can be predicted for each dimension of student body composition.

Having completed our discussion of school-wide contextual influences, we can now compare these results with those obtained for our within-curriculum measures.

Within-Curriculum Contextual Effects: Aptitude Composition (Con 3)

It will be recalled that these within curriculum measures were designed to tap a more meaningful interaction context for the application of our reference-group based model of student body composition influences. Curricula were divided into "academic" and "other" categories and average within-curriculum scores assigned to students in curricula with enrollments of at least 20. Students in curricula with smaller enrollments, and those who failed to report a curriculum, were assigned total school averages as their contextual measures. The correlation between the two context-controlled curriculum variables (Con 3 and Con 4) is .798, considerably higher than the .648 figure for the total school measures. Presumably this reflects the greater homogeneity of abilities and status factors within curricula.

The results presented in Tables 9.3 and 9.4 provide some interesting contrasts with those obtained for the total school contextual measures. Table 9.3 includes the full path model, while Table 9.4 presents the reduced model.

The most dramatic difference between the two models involves changes in aptitude contextual influences. While the negative average aptitude path (Con 3) to the Peer Plans Index is retained in the curriculum-controlled contextual model, the other two depressant negative contextual effects, those on academic performance and academic self-concept, drop out. It will be recalled that these latter two paths were the aptitude influences most consistent with our original formulation of contextual effects, while the remaining path had to be interpreted in an ad hoc, and not entirely satisfactory, fashion in our school-wide contextual model.

Interestingly, then, in attempting to design contextual measures which pertain to more meaningful interaction contexts, we have actually partialed out most of our contextual effect. Obviously this unanticipated consequence of employing within-curriculum average aptitude scores merits further consideration. Davis' (1966) original formulation of the "Frog-pond" hypothesis assumed that between educational institutions the distribution of performance scores would be independent of the relative competitiveness of the student body. This can be most readily understood if it is assumed that grades are normally distributed within schools. Consequently, regardless of student body aptitude level, each school will have approximately the same proportion of high achievers, low achievers, and so forth. In this fashion, the distribution of self-evaluations on the basis of relative performance should also correspond across schools, regardless of between-school differences in ability levels.

In controlling for curriculum in designing our contextual measures we have inadvertently violated this assumption of between-unit performance score equivalence. Apparently class quartile standing and curriculum enrollment are related to one another, as are both with the average aptitude score measure. Our model assumes that grades are normally distributed within curricula, such that a student enrolled in a non-college preparatory track has an equal probability of placing in the first quartile as does a college preparatory student. But this is not the case empirically. The data in Table 9.5 indicate that class standing is actually quite closely linked to curriculum enrollment.

Thus, college-preparatory students are considerably more likely to fall in one of the top two quartiles (70 percent) than are other students (45 percent). This distribution is subject to a number of possible explanations. Since most of our high schools are quite small, curricula may not be treated as structurally distinct entities, particularly with regard to coursework. Thus, enrollment in basic subjects, such as English and mathematics, may cut across curricula, with academic evaluation, consequently, being school-wide rather than curriculum bound. Alternatively, even with curriculum-defined course enrollment, it is possible that teachers often apply universalistic grading standards, such that the entire student body continues to serve as an evaluative frame of reference.

This confounding of curriculum enrollment, class standing, and average aptitude should be reflected in comparing our average aptitude scores within class standing quartiles for our curriculum-controlled and total school contextual variables. Such a comparison is presented in Table 9.6. Quite clearly, total student body competitiveness is unrelated to an individual's quartile standing, while within curricula competitiveness and class standing are related. Thus, as is postulated in the contextual effect model, between schools, class standing and average student body aptitude are unrelated. When aptitude averages are taken within curricula, however, the higher the class standing, the more rigorous the within-curricula, within-school competition. This problem arises essentially because our aptitude measure assumes curricula to be separable social units while our performance measure, class standing, takes the entire student body as its referent.

Since curriculum enrollment is related to both average academic aptitude and class standing, controlling for it in the construction of our contextual indices affects the aptitude-class standing relationship.

TABLE 9.3

FULL MODEL HIGH SCHOOL ATTAINMENT PATH COEFFICIENTS WITH CURRICULUM-CONTROLLED CONTEXTUAL VARIABLES, FOR MALES

Independent Variables	Dependent Variables								
	Peer	Stand 1	Parent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
Occ 1									.215
Educ 1								.506	.501
Ed Ex							.157	-.032	-.010
Imag 1						.022	.032	.040	.017
Teach					-.005	.048	-.024	.024	-.019
Parent					.018	.221	.021	.011	.047
Stand 1			.276	.209	.309	.117	.247	.121	.038
Peer		.172			-.000	.266	.130	.047	.019
Apt	.160	.429	.003	-.058	.262	.045	.151	.038	.027
Con 3	-.126	-.010	.094	.045	-.037	.092	.068	-.030	.034
Con 4	.328	-.037	.107	.098	-.027	.001	.104	.104	-.010
SES	.253	.105	.228	.148	.090	.188	.134	.099	.116
R^2	.243	.274	.250	.102	.239	.444	.465	.490	.591

"A" Coefficient For:	Peer	Stand 1	Parent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
S1	.415	-.543	.259	.338	1.17	.325	.080	-.173	.491
S2	.218	.057	-.250	-.365	-.167	.555	.881	.752	.697
S3	-.036	.476	.263	-.040	-.566	.101	.253	-.548	-.232
S4	.466	-.048	.820	.716	-.133	.048	.087	.812	-.439
S5	-.004	.847	.053	-.095	.344	.379	-.282	-.264	-.448
S6	.261	.010	-.070	.466	-.178	-.128	-.166	.081	.689

This leaves open the question of whether curriculum membership, a structural feature of the school's formal organization, or the quality of one's collective competition actually accounts for the depressant performance effects noted in Table 9.2.

Up to this point our discussion of the confounding effect of curriculum enrollment has been restricted to the zero-order relationships among the pertinent variables. While all of these zero-order effects are

TABLE 9.4

REDUCED MODEL HIGH SCHOOL ATTAINMENT PATH COEFFICIENTS WITH CURRICULUM-CONTROLLED CONTEXTUAL VARIABLES, FOR MALES

Independent Variables	Peer	Stand 1	Par- ent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
Occ 2									.234
Educ 1								.525	.542
Ed Ex							.165		
Parent						.251			
Stand 1			.282	.188	.311	.151	.256	.157	
Peer		.164				.284	.124		
Apt	.160	.423			.241		.171		
Con 3	-.126								
Con 4	.328		.180	.125			.154	.095	
SES	.253	.104	.230	.143		.222	.138	.110	.122
R^2	.242	.272	.250	.100	.228	.432	.462	.479	.585

"A" Coefficient For:	Peer	Stand 1	Par- ent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
S1	.415	-.560	.261	.356		.297	.109	-.226	.473
S2	.218	.039	-.243	-.405		.509	.870	.608	.628
S3	-.036	.424	.274	-.091		.171	.254	-.463	-.106
S4	.467	-.174	.812	.712		.153	.087	.890	-.302
S5	-.004	.926	.056	-.098		.261	-.268	-.309	-.384
S6	.261	-.019	-.082	.496		-.086	-.200	.163	.645

positive (except for the slight negative average aptitude correlation with performance) the question now arises as to the impact of curriculum membership in our contextual analysis with the influence of individual aptitude and social origins partialed out. Returning to our school-wide contextual model, if the average aptitude item is omitted and curriculum substituted in its place as a dichotomous variable, the curriculum-

TABLE 9.5

PERCENT IN EACH HIGH SCHOOL SOPHOMORE QUARTILE BY CURRICULUM ENROLLMENT, FOR MALES*

Sophomore Quartile	College Preparatory Curriculum	"Other"
(Highest) 1	31.8	7.9
2	38.9	37.8
3	24.6	45.7
(Lowest) 4	4.7	8.6
N	337	405

*Students who failed to report a curriculum are excluded from the table.

performance path is .100.[3] With both curriculum and average school aptitude included, their respective paths are .108 and -.148. In a similar fashion, the curriculum-academic self-concept path is -.002, while the simultaneous curriculum and aptitude influences on self-concept are .016 and -.116 respectively. It would appear that this extremely modes positive curriculum effect on self concept was just sufficient to drop our aptitude path below our cut-off point for retention in the reduced model.

Finally, we can examine within curricula average aptitude effects by actually controlling for curriculum membership, rather than having it confounded with our aptitude measure. The within curriculum average aptitude effect on class standing and academic self-concept, with individual characteristics controlled, are -.135 and -.161 respectively for the college preparatory students. For students enrolled in all other curricula, the corresponding paths are -.141 and -.101. Thus, both depressant aptitude composition effects are found to be operative within each curriculum. There is some extremely slight evidence indicating that these effects are somewhat related to curriculum membership. While the depressant effect of student body aptitude composition on performance is felt equally in both academic and non-academic curricula, its depressant

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[3] The curriculum paths reported are for the dichotomized curriculum item with nonrespondents assigned to the "other" category. When the 48 nonrespondents are deleted from the analyses the paths remain essentially unchanged. The decision to assign nonrespondents was based on the desirability of retaining sample comparability across all models discussed thus far.

TABLE 9.6

AVERAGE TOTAL SCHOOL AND WITHIN CURRICULUM CONTEXTUAL SCORES WITHIN CLASS STANDING QUARTILES, FOR MALES

Average Mean Aptitude Score	Sophomore Quartile			
	Top Quartile 1	2	3	Bottom Quartile 4
School Total	7.04	6.91	7.04	6.95
Within Curriculum	7.79	7.13	6.88	6.82

effect on academic self-concept weighs somewhat more heavily on the non-college preparatory students. This differential effect is extremely slight, however, and the major import of these within-curriculum comparisons is that the aptitude composition effects noted do indeed cut across curriculum boundaries.

The positive direct path of curriculum membership on performance (.108) does indicate, however, that the depressant effects of student body aptitude levels is somewhat offset by the salutary influence of participation in a college-preparatory program.[4] With individual aptitude and student body competitiveness controlled, students in academic curricula are somewhat more likely to have high class standing than non-college preparatory students. Since the depressant aptitude path is somewhat larger (-.148), the net effect of this curriculum-composition interaction would be to depress class standing slightly. However, the net positive indirect effect of both curriculum and social class context on performance (.04), to be discussed shortly, will almost exactly offset this net depressant effect. (These positive influences on performance are mediated through the Peer Plans Index.)

Thus, our rather intricate model of contextual and structural effects indicates largely offsetting influences, at least on performance scores as a dependent variable. Does the absence of substantial net effects imply that such phenomena do not merit consideration? We find ourselves completely in accord with Nelson's (1972: 147) position on this question, "The fact that school status effects cancel each other out should not detract, however, from this variable's theoretical importance." Furthermore, as their effects on academic self-concept in our analysis indicate, these student body composition influences are not necessarily always self-canceling.

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[4] The effects of adding curriculum membership to the analysis as a discrete variable are presented in detail in Table 9.9.

Within-Curriculum Contextual Effects: Social Status Composition (Con 4)

The social origins contextual influences in Table 9.4 also reflect the confounding of curriculum and context. Rather than partialling out this context effect, however, the curriculum-controlled average father's education item indicates a more pervasive contextual influence than had been noted for the corresponding school-wide measure. This effect is particularly notable for the Peer Plans Index, with a direct path of .328. Even when the offsetting negative effect attributed to within-curriculum average aptitude scores is omitted from the model, the social origins path is reduced only to .233, which is still the largest contextual path in the model. Furthermore, these paths are somewhat larger than the corresponding effects for the school-wide contextual model, which were .229 with the suppressant aptitude path included and .145 with it deleted. Thus, in this instance, the within-curriculum social status contextual measure does appear to have greater explanatory power than the corresponding total school measure.

It must be recalled, however, that just as with the within-curriculum aptitude measures, average father's education level and curriculum enrollment are confounded in this curriculum-controlled status composition measure. Students enrolled in college preparatory curricula have an average within-curricula student body social origins composition score of 3.85 as compared to an average "average father's educational" level of 2.88 for students in non-academic tracks. Thus, it is difficult to distinguish the effects of a refined interaction context from those of curriculum enrollment per se in Tables 9.3 and 9.4.

It seems entirely reasonable that these additional "contextual" influences could be attributable to the structural effect of enrollment in a college-bound curriculum. Consequently, the interpretation of the additional contextual effect on the Peer Plans Index noted In table 9.4 over that observed in Table 9.2 is open to question. When curriculum is added to the model as a distinct variable with the within curriculum contextual measures, the paths for curriculum, aptitude context, and social origins context are .218, -.129, and .187 respectively.[5] The social origins influence actually drops somewhat below its original value of .229, indicating that some small portion of the school-wide effect might actually be attributable to curriculum membership. Thus, the additional "contextual effect" noted above appears to be, in large measure, a function of the average aptitude-curriculum enrollment relationship.

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[5] These figures are not included in our tables. Table 9.9 does include the curriculum paths in the school-wide contextual effect model. Although the Table 9.9 figures do not correspond exactly with those discussed here for our within-curriculum contextual variable measures, they are comparable. The various effects presented in Table 9.9 summarize the consequences of introducing curriculum membership to the analysis as a discrete variable.

In addition, the effects obtained when curriculum is actually controlled in the analysis provides further evidence of its confounding influence. The within-curriculum average aptitude and average fathers' education paths to the Peer Plans Index are -.061 and .129 respectively for college preparatory students, and -.202 and .228 for students enrolled in all other curricula. The depressant and salutary contextual influences are largely self-canceling for non-academic students. For college-preparatory students, the positive influence of student body status composition on Peer Plans exceeds somewhat the negative effect of aggregate competence levels, although both effects are modest. It seems, then, that the curriculum-control serves to specify the nature of the contextual effect while, at the same time, adding additional explained variance that could inadvertently be attributed to the contextual influences. The same is the case with the significant paths to be discussed next. These were all deleted from the reduced model for the school-wide contextual influences, while retained for our within-curriculum measures. It is likely that their significance can be attributed to the confounding of curriculum with context, rather than any refinement of actual contextual influences. We shall address ourselves to this question after discussing the effects themselves.

Before turning to these other effects, however, it might be noted that the addition of the contextual variables at this point in the model does increase our explanatory power somewhat. The proportion of explained variance for the Peer Plans Index rises from .199 in the reduced non-contextual model to .243 with the addition of these two curriculum-contextual measures. Obviously, though, much of the influence attributed to them must involve a redistribution of the effects already noted in context-free attainment models. Indeed, this is the case, with the direct paths for all of the other variables in the model diminishing somewhat. The most sizable reductions occur for the Acquisition Index, whose A drops from .547 to .467. The summary sheaf coefficient in this contextual model is .253, down from a social origins effect of .355 in the full attainment model without contextual variables.

As in our first contextual model, no direct social origins composition influence on academic performance is observed in Table 9.4. However, as hypothesized, there is a modest indirect effect through the Peer Plans Index. This mediated influence would be a path coefficient of .044. Somewhat less than half of this indirect salutary social origins influence on performance, however, would be offset by the suppressant indirect effect of ability composition through the Peer Plans Index.

We can also observe status composition-curriculum effects on our two adult contact indicators in this model. Although modest in magnitude, these effects do exceed the corresponding paths from the total school contextual model, both of which were deleted from the reduced model. The path of the confounded curriculum-social origins composition item on parental contact regarding college plans is .180, while that for the teacher-counselor item is .125. It might be noted that both of these paths exceed all of the individual social status item paths into either variable, except that for the Acquisition Index on parental contact, which is .187. Indeed, each such effect comes quite close to equaling its corresponding gross sheaf coefficient, which are .230 and .143 respectively. Furthermore, since each of these sheaf coefficients subsumes some modest negative status indicator influences, the positive individual social status and contextual-curriculum influences are actually more comparable than these sheaf comparisons would imply. The drop in these sheaf coefficients from Table 9.2 to Table 9.4 indicates that much of the effect of the composition variables is obtained at the expense of individual status indicators.

Since the teacher-counselor contact item has no influence on any subsequent variables in the model, the .125 context-curriculum path to it has no further impact through this item. The parental contact item, however, does have a significant effect on educational expectations, with a path of .251. Consequently, the mediated within-curriculum class composition effect on educational expectations through parental contact would be .031. When added to the indirect curriculum-composition influence on educational expectations through the Peer Plans Index of .093 (part of which is offset by negative aptitude influences), this indicates a notable mediated composition influence on goal-setting.

While all of the within-curriculum social origin composition influences discussed thus far have been mediated through one or another of our "significant other" variables, Table 9.4 includes two such paths which are not so mediated. Thus, we can observe modest direct curriculum-composition paths of .154 and .094 on educational attainments and early occupational status respectively. Since educational level itself is, in turn, a major determinant of early occupational attainments, there is also an indirect influence on occupational status via the intervening educational attainments variable. This indirect path would be .084. Once again, a comparison of the sheaf coefficients and multiple correlations in this contextual model with the earlier full attainment model would indicate that much of the curriculum-context influence involves a redistribution of effects previously accorded to individual status background indicators.

The results for our within-curriculum social origins composition variable indicate more direct influences than had been anticipated. These effects were considerably more pervasive than those obtained for total school contextual effects. Four of the five significant status composition paths in Table 9.4 failed to meet our criteria for retention when the total school contextual measure was employed. On the other hand, these influences are largely mediated through the various "significant other" variables, as had been hypothesized to be the case. The status composition-peer plans path was the largest of the five, which, again, is consistent with our two-stage model developed in our introductory chapters. The direct paths to educational expectations and first occupational attainments had not been predicted. These paths indicate that the contextual influences, if they are substantively meaningful, are not entirely mediated through the interpersonal mechanisms postulated.

It is this question of substantive meaning which must now be addressed. We had indicated earlier that our combining curriculum and contextual variables, in an attempt to refine the social context being examined, actually served to confound two potential causes of the various dependent variables in our models. Thus, we have been compelled to discuss, somewhat awkwardly, the combined curriculum-social composition influences noted in Tables 9.3 and 9.4. At this point, we will try to determine whether these effects can actually be attributed to one or the other of these variables. Table 9.7 presents the direct paths for both school-wide social origins composition and curriculum membership for each of the four dependent variables just discussed when both are included in the attainment model simultaneously, with all other variables included as in Table 9.4.[6]

This distribution of effects emerges quite clearly in Table 9.7. Both items contribute somewhat to the combined context-curriculum effect on educational and early occupational attainments, with neither of the individual effects on the latter being sufficiently large to warrant retention in our reduced model. On the other hand, the effects on the two adult contact items are almost entirely attributable to curriculum enrollment. Thus, participation in a college-preparatory curriculum serves to increase contact with both parents and teachers regarding college plans.[7] Once curriculum is introduced as a distinct variable, social class composition

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[6] The paths for the Peer Plans Index are not included at this point. These effects were discussed earlier with the conclusion that curriculum membership per se accounted for the increment in paths from the total school to within-curriculum models.

[7] The introduction of curriculum enrollment to these models as a discrete exogenous variable of course assumes that it is causally antecedent to all subsequent variables. At least with regard to parental contact, the opposite direction of influence seems an equally reasonable possibility and merits consideration.

TABLE 9.7

SIMULTANEOUS STATUS COMPOSITION AND CURRICULUM EFFECTS
ON SELECTED DEPENDENT VARIABLES FROM THE
CONTEXTUAL ATTAINMENT PROCESS MODEL

	Dependent Variables			
	Parent	Teach	Educ 1	Occ 1
Curriculum	.255	.186	.093	.040
Status Composition	.031	.014	.110	.071

is found to be unrelated to the two "significant other" items. Thus, curriculum enrollment per se appears to account for much of the joint curriculum-social class composition effects just discussed.

Table 9.8 permits us to compare the joint curriculum-context item effect against those of the curriculum variable alone when they are used interchangeably in the model. That is, the path coefficients are derived from parallel analyses of the same model, with the curriculum item included in one and the confounded curriculum-context variable employed in the other. Once again, other variables in the analyses are those included in the reduced model in Table 9.4.

Only for the early occupational attainments item does social class composition appear to add any explanatory power to the analysis. In the other three comparisons the separate curriculum item effects are actually the larger. It seems, then, that curriculum membership alone actually has greater explanatory power in these instances than does the confounding of curriculum and status composition influences. The fact that the confounding of the two items in the within-curriculum variable is only partial would seem to account for these differences. It will be recalled that only those youth in curricula with an enrollment of twenty or greater were assigned within-curricula composition scores. Those youth in curricula with smaller memberships were assigned schoolwide averages for their contextual variables. Consequently, curriculum and composition effects are confounded only for those students in curricula with large enough enrollments to have been assigned within-curriculum status composition and aptitude averages. The introduction of curriculum enrollment as a discrete variable, then, reveals that much of the "curriculum-status composition" effects are actually attributable to the "curriculum" dimension of that confounded variable.

This reexamination of the within-curriculum contextual effects leads us to the following conclusions: the confounding of context and

TABLE 9.8

ALTERNATIVE CURRICULUM AND CURRICULUM-STATUS COMPOSITION EFFECTS ON SELECTED DEPENDENT VARIABLES FROM THE CONTEXTUAL ATTAINMENT PROCESS MODEL

	Dependent Variables			
	Parent	Teach	Educ 1	Occ 1
Curriculum	.273	.194	.155	.079
Curriculum-Status Composition	.180	.125	.154	.095

curriculum is indeed misleading; many of the curriculum-composition effects are actually attributable to curriculum membership per se; in particular, most of the within-curriculum social origin composition effects are actually a function of curriculum influences; even distinguishing between contextual and curriculum effects, though, the general import of our school-wide contextual analysis remains unchanged.

Thus, distinguishing between the structural effect of curriculum membership and the contextual effects of social status and aptitude composition has actually led to a considerable refinement of our attainment model. Not only are the contextual effects largely as anticipated, with negative paths from average aptitude level to relative performance scores and a positive effect of social status composition on peer plans, but we have also been able to distinguish a unique influence of curriculum membership on contact with both parents and teachers regarding college-going plans. Thus, both student body composition and the individual's place in the school structure seem to affect the within-school elaboration of attainment processes.

Our final reduced form model, introducing curriculum enrollment as an additional exogenous variable is presented in Table 9.9. In it, both curriculum and contextual variables are observed to function in the ways just outlined. This model summarizes the conclusions of our rather extended discussion of the consequences of disentangling curriculum and contextual effects. At this point, we will merely summarize those conclusions, since the effects in Table 9.9 have almost all been discussed previously. The hypothesized contextual effects of social class and aptitude composition are not themselves affected by the introduction of curriculum to the attainment model as a distinct variable. Rather, curriculum itself is observed to have a direct impact at a number of points in the model, and these effects often serve to supplement or offset the contextual effects which are retained. Thus, curriculum has a sizable direct effect on the Peer Plans Index, as does student body status composi-

TABLE 9.9

REDUCED FORM HIGH SCHOOL ATTAINMENT MODEL WITH CURRICULUM AND SCHOOL-WIDE CONTEXTUAL VARIABLES, FOR MALES

Independent Variables	Dependent Variables								
	Peer	Stand 1	Par-ent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
Occ 1									.234
Educ 1								.546	.542
Ed Ex							.147		
Parent						.212			
Stand 1			.230	.151	.294	.133	.238	.149	
Peer		.137				.261	.132		
Apt	.131	.420			.275		.169		
Con 1	-.117	-.148			-.112				
Con 2	.178								
Curric	.209	.108	.289	.204		.157	.146		
SES	.249	.100	.224	.139		.194	.164	.135	.122
R^2	.259	.299	.290	.122	.240	.448	.462	.479	.585

"A" Coefficient For:	Peer	Stand 1	Par-ent	Teach	Imag 1	Ed Ex	Educ 1	Occ 1	Occ 2
S1	.374	-.618	.188	.274		.298	.055	-.065	.473
S2	.249	.050	-.232	-.403		.546	.789	.546	.628
S3	-.040	.448	.237	-.144		.108	.257	-.291	-.106
S4	.502	.110	.894	.792		.113	.257	.852	-.302
S5	-.052	.817	-.018	-.144		.355	-.324	-.313	-.384
S6	.269	-.040	-.076	.511		-.134	-.122	.153	.645

tion. These factors, operating through peer plans, have a salutary indirect influence on performance which almost offsets entirely the depressant effect of aptitude composition on this variable Curriculum enrollment per se has a significant effect on both parental and teacher-counselor contact regarding college plans. And, finally, curriculum effects may also be observed directly on both educational expectations and actual educational attainments. The absence of any contextual variable effects on these latter four variables indicates that most of the significant effects noted for the combined status composition-curriculum variable were actually attributable to curriculum enrollment itself.

These data indicate quite clearly, then, that the fact of curriculum enrollment, with individual status and aptitude characteristics controlled, plays a significant role in the educational sorting process. Certainly, these structural effects of curriculum membership are more pervasive than the contextual influences which have been the major focus of our attention. Such results lend empirical confirmation to Parsons' (1959) speculations regarding the importance of curriculum enrollment in academic sorting and subsequent attainments. Similarly, they support Folger and Nam's (1965: 51) inference that curriculum membership contributes to college enrollment even with individual ability and class background influences controlled.

Summary and Discussion of Contextual Analysis

The results of our contextual analysis have been, on the whole, as anticipated. Aside from a somewhat perplexing negative average aptitude effect on peer plans and modest direct effects for curriculum-controlled social origins composition on both educational attainments and first occupational status, the contextual models indicated that most composition effects are mediated as hypothesized. Most of the influence of academic aptitude composition was conveyed through its depressant effects on relative performance scores and, hypothetically, through other classroom cues which also served to depress self-perceptions of academic competence directly. A detailed examination of the influence of curriculum enrollment on these processes, prompted by the unanticipated partialling out of these effects with our within-curriculum aptitude composition measures, revealed that both structural characteristics of the tracking system and compositional features of the student body each had a unique effect on performance scores. While participation in a college preparatory curriculum served partially to offset these aptitude effects, it was still found that competition with higher aptitude students depressed relative performance scores and lowered academic self-conceptions somewhat when individual aptitude and social background characteristics were controlled.

At the same time, social origin influences were also found to function largely as anticipated. All of the salutary effects of student body social class composition were mediated through the Peer Plans Index. The curriculum controlled class composition variable revealed a somewhat more pervasive contextual influence, with significant direct paths to both of the other two "significant other" items, as well as to educational and early occupational attainments. However, these additional influences were almost entirely attributable to the structural effect of curriculum enrollment. Most of this additional effect was a consequence of participation in a college-oriented program. Such participation was associated with more frequent discussions with various adults regarding college plans and a somewhat increased likelihood of holding higher educational expectations and of attaining higher levels of formal education.

The confounding of contextual and curriculum effects in our within-curriculum measures should not distract us from the fact that the results for the total school measures were almost exactly as predicted. The significant aptitude contextual effects had depressant influences on both class standing and academic self-concept, while social status composition had a positive effect on the Peer Plans Index. The curriculum item had no substantial effect on these basic relationships.

We have already noted that the aptitude effects, as modest as they are, provide rather compelling evidence for a "real" contextual influence. The argument most commonly articulated against such effects assumes that uncontrolled individual level variation actually accounts for effects attributed to "contextual" variables. Since we have controlled on fully six background status indicators as well as our measure of academic aptitude, our individual level controls are probably considerably more elaborate than those commonly employed in such analysis. Furthermore, our model postulates negative contextual influences, while individual level traits would be positively related to the dependent variables of interest. Thus, it is extremely unlikely that remaining uncontrolled individual level variation would account for our observed negative contextual effects. This is not to assert unequivocally that this is not the case. In our commentary on Hauser's reservations regarding contextual analyses, we conceded that our research designs will not permit such unequivocal assertions. Nevertheless, results such as these, which permit us to reject a wide range of competing explanations, provide considerable confidence in the "contextual effect" interpretation (Stinchcombe, 1968).

Beyond our own results, this analysis is quite consistent with other studies of these phenomena. They can be added to the growing body of data indicating contextual relative deprivation and mediation effects in educational settings (Davis, 1966; Nelson, 1972; Werts and Watley, 1969; Drew and Astin, 1972; Campbell and Alexander, 1965; Meyer, 1970). At the same time, they might perhaps offer an explanation of why at least one study failed to uncover social status composition influences on educational expectations. Sewell and Armer's (1966) failure to obtain such effects has played a central role in the polemic over contextual influences (Turner, 1966; Boyle, 1966; Michael, 1966; Hauser, 1970). While controlling for individual aptitude and family background status levels, they examined average school status effects on college-going intentions. Although their results were negative, our comparable analyses also failed to provide any evidence of a direct school-wide contextual effect, either for ability or status composition, on educational expectations. The mediation model implies, however, that such contextual influences should have their impact earlier in the attainment process, with eventual effects on educational goals being mediated principally through relative performance scores and various "significant others" (particularly through the college-plans of peer associates). This was the case with our data. Thus, if our conceptualization of these processes is accurate, Sewell and Armer's essentially negative results are not surprising. Nelson (1972) has also observed that Sewell and Armer failed to anticipate the mediated, and somewhat off-setting, effects predicted under a fully elaborated model of contextual effects in which the depressant effects of aptitude context are controlled.

Finally, we wish to reiterate that the magnitude of these effects is, at best, quite modest, with effects often canceling out one another. This being the case, and with the substantial methodological problems involved in obtaining compelling evidence for such processes, can it still be argued that the considerable attention and effort devoted to the study of contextual effects is well spent? We would reply in the affirmative to this question.

The contextual effect hypothesis is ultimately derived from a reference group theoretical orientation. To deny the possibility of such group composition influences on individual outcomes is actually to call into question most "mainstream" sociological endeavors. Rogoff (1962: 270) articulates the essential logic of the compositional argument in her analysis of between school effects for the Seniors in our original 1955 sample as follows:

> . . . If it can be shown that the average aptitude at a high school represents something of a collective property . . . then the interpretation (of effects) has a different logical character. It does not rest on independent influences on each youth, but on shared or collective influences, affecting all youth with membership in a common student body. The first interpretation would have us assume that the 35,000 high school seniors in the sample behave as they do by virtue of 35,000 independent sets of social influences. The second would reduce the set by attributing at least some weight to the collective influence of the school on all of its students.

The assumption of such influences is well grounded in sociological theories, such as reference group frameworks, which are anti-atomistic. Consequently, the pursuit of contextual effect analyses would seem to have far-reaching implications. Even "modest" effects, if they are truly theoretically significant (not necessarily in the statistical sense) would seem to merit continuing investigation.

Furthermore, even "modest" effects can have enormous "real world" consequences. It should not be ignored that school social class and aptitude compostition are some of the more readily manipulable of the variables thus far examined as being of consequence in the attainment process.

The search for such manipulable attainment process variables was a major reason for Sewell's (1969) interest in designing a social -psychological elaboration of Blau and Duncan's basic model of the attainment process. If such contextual variables are indeed influential, and if they are indeed potentially manipulable either by the social science researcher or by the social planner, the implications for both "pure science" and planned social change, respectively, are clear. Both interests demand further exploration of these processes.

CHAPTER 10

COLLEGE ATTAINMENT PROCESSES AND CONTEXTUAL EFFECTS

In a sense, this analysis of college attainment processes is somewhat anticlimactic. This is particularly the case regarding our interest in the two-dimension, mediated-influence contextual effect model. While we were able to examine all of the hypothesized social status and aptitude composition effects in our high school attainment models, this will not be feasible at the college level. We will be limited to one student body composition measure. This is the Astin College Selectivity Score. As is described in greater detail in the methodology chapter, this score is essentially the ratio of highly competent students desiring to attend a given college to total freshmen class enrollment. Presumably, the higher this ratio, the more academically competitive and able the student body. Thus, the Astin Scale corresponds roughly to the average aptitude item employed in the high school analysis.

Although we will not be able to contrast aptitude and status composition influence on college attainments, there is some indirect evidence which indicates that both factors may not be of equivalent importance in affecting college outcomes. While most contextual analyses of college environmental effects have been restricted to a single aptitude composition measure (Drew and Astin, 1972; Davis, 1966; Spaeth, 1968; Werts and Watley, 1967), as will be the case in our analysis, a number of studies of individual level influences indicate that social origin effects on college attainments are negligible. Their major impact seems to be felt at the high school-to-college transition. Beyond this point, aptitude is the major background determinant of educational attainments (Folger and Nam, 1965; Wolfle, 1954). Although there are some indications that the enduring influence of social status background on eventual college graduation may be somewhat underrated (Eckland, 1964), it still seems likely that ability influences substantially exceed those of social origins at the college and post-graduate levels (Eckland, 1965). Indeed, Spaeth's study of the attainment processes of 1961 college graduates found social background effects to be so inconsequential that they were dropped entirely from his models (1968; 1970).

Much the same appears to be the case regarding the relative importance of social background and ability influences at various educational levels for our sample. In our evaluation of various characteristics of

TABLE 10.2

INTER-ITEM CORRELATION MATRIX FOR VARIABLES IN THE COLLEGE LEVEL ANALYSIS

	S2	S3	S4	S5	S6	Apt	Stand 2	GPA	Major	Imag 2	Educ 2	Occ 1	Occ 2	Select	Con 1	Con 2	Curric
S1	.388	.524	.393	.263	.311	.134	.064	-.067	.049	-.029	.072	.050	.085	.136	.064	.109	.159
S2		.623	.490	.425	.404	.257	.070	-.032	.074	-.001	.185	.175	.191	.180	.189	.242	.183
S3			.478	.327	.393	.266	.061	.087	.112	.016	.190	.140	.192	.124	.212	.280	.257
S4				.427	.480	.185	.044	-.064	.027	-.004	.090	.227	.068	.234	.232	.345	.205
S5					.456	.104	.075	.035	.019	.008	.043	.060	-.004	.061	-.042	-.043	.089
S6						.072	-.090	-.054	.007	-.018	.035	.090	.091	.060	.128	.250	.099
Apt							.472	.292	.200	.170	.316	.281	.271	.196	.195	.135	.222
Stand 2								.312	.282	.190	.330	.285	.248	.278	-.088	-.107	.131
GPA									.093	.422	.236	.161	.188	-.091	-.036	-.029	.078
Major										.022	.215	.163	.191	.085	-.027	-.002	.147
Imag 2											.191	.153	.156	.012	.021	.050	.177
Educ 1												.526	.669	.261	.104	.174	.225
Occ 1													.493	.200	.094	.189	.300
Occ 2														.129	.082	.123	.202
Select															.181	.296	.171
Con 1																.666	.195
Con 2																	301

TABLE 10.1

MEANS AND STANDARD DEVIATIONS FOR MAJOR VARIABLES EMPLOYED IN THE COLLEGE-LEVEL ATTAINMENT PATH ANALYSIS

	S1	S2	S3	S4	S5	S6	Apt	Stand 2	GPA	Major	Imag 2	Educ 2	Occ 1	Occ 2	Select	Con 1	Con 2	Curric
Mean	3.88	3.05	3.82	0.36	3.14	2.68	9.20	2.50	4.16	0.67	0.26	2.52	3.46	4.42	44.40	7.12	3.37	0.64
Standard Deviations	1.29	1.40	1.87	0.84	0.87	0.62	3.92	1.27	2.11	0.47	0.58	1.39	1.64	1.27	17.20	1.07	0.58	0.48

the "basic attainment model" in Chapter 6, we observed that ability influences somewhat exceeded those for the set of six status background indicators in relation to level of educational attainments for the entire sample. The two path coefficients were, respectively, .367 and .303, with the latter sheaf coefficient subsuming largely positive individual status item effects (only one of the six A coefficients into the SES construct was negative, and its value was quite small). The corresponding paths for our college-going subsample, in comparison, are .277 and .143 respectively. The figures indicate, then, a diminished influence of social origins on the educational attainments of the college-going population. At the same time they also imply some importance for social background influences on the selection into college.[1] If we can generalize these individual level differences to the relative importance of aggregate measures at various educational levels, we might assume that ability composition should be the dominant contextual variable in college environments. Ideally, we would test this assumption, but such an analysis is not feasible at this point.

Consequently, our analysis of contextual effects at the college level will be restricted to the impact of student body ability composition on the attainment process. Before turning into this contextual analysis, however, we will begin by examining some of the various individual level variables which might affect the educational outcomes of college-going youth.

The General Attainment Process: College Level

Tables 10.1 and 10.2 contain the means, standard deviations, and inter-item correlations for all the variables included in this chapter's models. As was the case with the models in Chapter 6, the appropriate coefficients linking the exogenous variables in our models are the various zero-order inter-item correlations presented in Table 10.2. Due to space considerations, these exogenous variable intercorrelations will not be included in the path coefficient tables which follow. The individual level variables are presented first in Table 10.2, followed by the various school contextual and structural effect measures. These include the College Selectivity Index, the high school level contextual variables and the high school curriculum membership item. These latter variables will be introduced to the analysis later in this chapter. First, however, we will direct our attention to the model of college attainment processes containing only individual level items. The causal ordering of our within-college individual level variables may be portrayed as follows:

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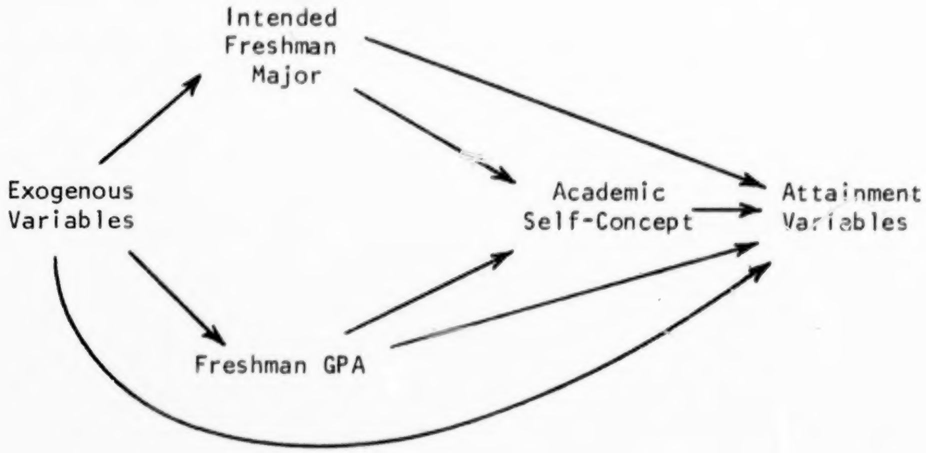
[1] This conclusion is based on the part-whole nature of the comparison. Since background influences are considerably more important for the educational attainments of high school students than of college students, and with the latter being a subset of the former, most of the difference in importance must have its impact at the high school-college transition.



As in our previous high school analysis, it is anticipated that these intervening variables function primarily to mediate the influence of various antecedent variables.

Tables 10.3 and 10.4 contain, respectively, the full[2] and reduced form path coefficients for this model. A prominent feature of these models is their only moderate explanatory power, particularly with regard to the three "within-college" intervening variables. The proportions of explained variance for the "intended major" (high performance versus "other"), freshman grade point average, and academic self-concept items in the full model are .096, .173, and .186 respectively. Thus, when in the course of our discussion we make reference to the "major determinants" of these various variables within the model, it should be recalled that the overall explanatory power for the entire set of independent variables is quite modest. Obviously, major factors affecting these processes, or at least an extremely large number of minor ones, have been neglected. The exogenous variables included in these models are, with one exception, the same as were employed in the full high school attainment model.

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[2] It will be noted that one path is excluded from this "full" model. This is the relationship between intended freshman major and freshman grade point average. Since there is considerable ambiguity in the temporal ordering of these variables, it was felt that we could not justify imposing a causal ordering on their relationship.

TABLE 10.3

COLLEGE LEVEL FULL ATTAINMENT PROCESS MODEL, FOR MALES

Independent Variables	Dependent Variables					
	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
Occ 1						.196
Educ 2					.453	.533
Imag 2				.092	.036	.015
Major			-.035	.111	.029	.031
GPA			.406	.089	.011	.017
Stand 2	.253	.221	.062	.190	.092	-.001
Apt	.060	.202	.033	.120	.059	.025
SES	.107	.220	.056	.158	.197	.132
R^2	.096	.173	.186	.196	.336	.495

"A" Coefficient For:	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
S1	-.205	-.622	.020	-.184	-.285	.181
S2	-.047	-.722	.455	.795	.183	.484
S3	1.20	1.01	-1.126	.525	-.310	.280
S4	-.382	-.527	.632	0.0	1.103	-.703
S5	-.280	.382	-.553	-.392	-.305	.686
S6	.168	-.059	.316	.038	.153	.695

These are the six social status background indicators and the academic aptitude test score. The one addition to this set of exogenous variables is the high school quintile senior class standing item.[3] Its inclusion

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[3] Please note that this is not the same as the sophomore quartile item included in the high school level models. The inclusion of this item earlier would have required the deletion of all high school dropouts from the analysis. Its addition at this point obviously does not have such sample attrition consequences since, presumably, all college-goers have completed high school. Since the senior class standing item pertains to overall or final-year high school performance, it is the more appropriate of the two high school performance items for the analysis of high school performance effects on college-level attainments.

TABLE 10.4

COLLEGE LEVEL REDUCED FORM ATTAINMENT PROCESS MODEL, FOR MALES

Independent Variables	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
Occ 1						.204
Educ 2					.514	.548
Major				.105		
GPA			.422			
Stand 2	.280	.221		.224		
Apt		.202		.149		
SES	.119	.220		.153	.198	.135
R^2	.094	.173		.176	.316	.493

"A" Coefficient For:	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
S1	-.202	-.622		-.301	-.272	.156
S2	.017	-.722		.667	.196	.468
S3	1.170	1.01		.693	-.242	.364
S4	-.320	-.527		-.078	1.124	-.713
S5	-.286	.382		-.353	-.237	-.654
S6	.151	-.059		.033	.030	.661

will permit us to examine enduring high school performance effects on college attainments.

In comparing Tables 10.3 and 10.4 we can again note the large number of paths which fail to meet our criteria for retention in the reduced form model. Much as in the analysis of high school processes, most of the intervening school-related variables have no direct effect on actual occupational attainments. Rather, all such influences, if they are operative at all, are mediated through their direct effect on educational attainments. We find it necessary to qualify this statement by the remark "if at all" due to the marginal importance of these effects on educational level. In Table 10.3 it can be noted that all three college variable paths, those for intended freshman major, freshman grade-point average, and academic self-concept, are negligible, being in the .09 to .11 range. Consequently, only one of these paths, that for intended freshman major, was retained in the reduced form model. It might be mentioned, however, that given the indirect effect of freshman GPA on educational attainments, through academic self-concept, of .036, the sum of the direct path and this indirect effect, at .126, would exceed our cut-off point for retention. Thus, had the academic self-concept item not been included in the model, it is likely that the freshman GPA-educational attainments path would have been retained in the reduced model. Nevertheless, its actual influence on formal educational level would have been quite modest.

Spaeth's analysis of the attainment processes of college graduates (1970) obtained a somewhat greater senior grade point average-graduate enrollment effect than that obtained for our freshman performance measure. While his path of .192 is not dramatic, it does imply a greater college performance effect than in our data. It should be recalled, however, that our analysis includes a wider range of educational attainments than does Spaeth's. Fully 214 of the 525 male college-goers (40.8 percent) in our entire sample never graduated.

In large measure, then, our analysis of educational attainments actually pertains to factors affecting the likelihood of graduation. Although this is not entirely the case, the issue of college graduation is obviously more consequential in our results than would be true for Spaeth's study of college graduates. Thus, a possible explanation for the difference in performance effects in the two studies would involve the following propositions: independent of various background factors, freshmen performance is not a consequential determinant of college attrition, thereby reducing our freshman performance-educational attainments relationship; secondly, given college graduation, further educational attainments are significantly affected by college performance indicators, in this case senior grade point average. If we were to restrict our analysis to the 254 college graduates in our sample with responses on all variables in the model (including contextual variables) and add overall GPA to the model, the "total GPA"-years of education path would be .246, considerably higher than the freshman GPA-educational attainment path of .090. This senior GPA, it should be noted, is computed with all other variables included in the regression equation and, thus, controlled. These results, then, are quite consistent with Spaeth's and imply that at least these differences between our analyses can be explained by differences in the samples and the nature of the variables employed. We will have occasion to return to Spaeth's results in our discussion of contextual influences in these processes.

Thus, the major factors affecting educational and occupational attainments are, as before, various background influences and the effects of earlier attainments on later ones. The factors most strongly influencing present occupational attainments remain, in order of importance, educational level, first occupational status, and, lastly, social origins. As the A coefficients in Table 10.4 for this latter effect imply, the positive effect of father's occupation, mother's education, father's education, and neighborhood status on current occupational status are largely offset by the depressant influences of both the relative family income and acquisition index items.

Similarly, the major effect on early occupational status is attributed to educational attainments, with a secondary influence for social origins. In this case also, there are a number of negative A coefficients into the status background construct, but these are all relatively minor and are more than offset by the dominant Acquisition Index effect on the sheaf value. Indeed, the A coefficient of 1.124 for the Acquisition Index indicates that its individual positive effect exceeds that for the gross sheaf coefficient (the direct Acquisition Index Beta for the first occupational status would be .223, as compared to the sheaf coefficient of .198). The fact that the summary sheaf is smaller than one of the direct effects it summarizes is a function of the various indirect suppressant effects involved in the interaction of these individual origin items. The direct effect of academic aptitude on both occupational attainment items is non-significant.

The educational attainments item has a somewhat greater number of determinants than is the case for the two occupational attainment variables. The four variables with direct paths to educational attainments retained in the reduced model are high school senior class standing, intended freshman major, academic aptitude, and social status origins. The last three effects are of essentially equal magnitude, ranging from .105 to .153, while that for high school class standing is somewhat larger at .224. Thus, again, we find that academic aptitude and performance influences somewhat exceed those for status background in relation to educational attainments. In this instance also, some of the individual status item effects are negative.

We have already discussed the apparent unimportance of freshman grade point average for college attainments. This absence of effect becomes all the more interesting given the significance of high school class standing for educational levels to be observed in Table 10.4. This path is .224, and is the largest of any of the direct effects on educational attainments. Actually, as will be discussed in the following section, once the depressant effects of college selectivity on freshman grade point average are removed, the importance of these two performance measures is reversed. Thus, the contextual aptitude effect may offer at least a partial explanation for the somewhat surprising inconsequence of college performance for educational attainments. At this point, though, high school class standing appears to have the single largest direct effect on educational levels.

The other direct effects in Table 10.4 indicate that intending to select a high performance major has a slight positive influence on educational level achieved, as does academic aptitude, even with the effect of the two performance measures and social origins controlled. Actually, academic aptitude also has a sizable indirect effect on educational level. In the introductory section of this chapter we noted that the direct aptitude path to educational levels was .277 with only the six status background variables controlled in the model. Consequently, the reduction of the direct aptitude path from .277 to .149 in Table 10.4 must be attributed to the introduction of the various variables which serve to mediate the aptitude influence on educational attainments. The most important such intervening variables in this instance would be the high school and college performance indicators. Thus, as would be expected, much of the effect of academic aptitude on eventual level of educational attainments is mediated through academic performance.[4]

Turning now to the college level variables which intervene in Tables 10.3 and 10.4 we can note that again, as at the high school level, the academic self-concept index has no significant impact on any subsequent variables in the model. Hence, it is dropped from these models as an independent variable. Furthermore, freshman grade point average is the only notable determinant of academic self-concept, with a direct path of .422. It will be recalled that in the high school analysis both aptitude and sophomore quartile standing were related to the self-concept index with each of these separate effects, at .241 and .311 respectively (Table 6.6), being over half the magnitude of our college performance-college self-concept path. Hence, while academic aptitude is unrelated to collegiate self-conceptions, the performance-self-concept path is actually larger at the college level. Four possible explanations come to mind to account for these differences: at the college level, previous performance might actually be more important in determining one's conception of his academic competence; the freshman grade point average item might be a more adequate performance indicator than our combined "objective-subjective" sophomore quartile standing variable; the reduction in aptitude variance at the college level limits its explanatory power; and, the aptitude effects might be distributed over a greater number of mediating variables in the present instance than was true in the high school analysis. Regarding the last point, much of the senior class standing effect on academic self-concept (.062) in Table 10.3 would probably be attributed to aptitude influences were class standing deleted from the model. It is not at all unlikely that each of these factors plays a modest role in accounting for these high school-college differences. At any rate, in both educational settings, academic self-concept is found to be largely a function of aptitude-performance influences, and, in turn, it itself appears to have no impact on the various educational and occupational outcomes examined.

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[4] The aptitude and high school quintile measures are both treated as exogenous variables in relation to college attainment processes and, hence, the causal relation between the two is not examined in Tables 10.3 and 10.4. Obviously, though, high school class standing can be treated as dependent upon aptitude, so that our interpretation of the non-directional link between the two, reflected in their correlation of .472, can be cast in causal terms. When senior class quintile is treated as dependent upon academic aptitude and the six status background indicators for the entire high school sample, the aptitude path is .485. That for the set of six status indicators is negligible.

Actually, though, this conclusion may overstate the case somewhat. Our data indicate that such self-concept measures have no direct consequences on ultimate attainment variables, such as level of education achieved and occupational status, but had we examined, for example, multiple performance measures at various stages of the undergraduate career we might very well have found that self-concept mediates part of the linkage between early and late performance measures. These performance indicators, in turn, might have direct consequences for the ultimate attainment variables in the model. Indeed, if we restrict our attention to the 254 male college graduates in this sample with information on all variables, and add "total" GPA to the model, the academic self-concept-"total" GPA path is .230, while the direct freshman GPA-"total" GPA path is only .380. Furthermore, the "total" GPA-educational attainments path is .246, indicating an indirect self-concept effect on educational attainments, through "total" GPA, of .045. Thus, we should somewhat more conservatively conclude that the academic self-concept index has no notable effects on those subsequent attainment process variables included in our major models. Its impact through channels other than those examined in Tables 10.3 and 10.4 remains an open question.

The various influences on the intended major and freshman grade point average are largely as would be anticipated. The former is affected by both high school class standing (and, consequently, indirectly by aptitude) and social origins, while the latter is influenced by high school standing, academic aptitude, and social origins. All of the aptitude-performance effects on these two dependent variables are in a similar range, with direct paths of from .202 to .280. The sheaf coefficient to intended major is .119, while that for freshman grade point average is .220.

It is interesting to note that in both cases father's education is the dominant status indicator effect on the sheaf coefficient. The father's education A coefficient exceeds 1.00 in both sheafs, implying some suppressor effect for the interaction of other status indicator items with this predominant background influence. In addition, for both dependent variables, the A coefficients indicate a considerable degree of self-canceling influence for the various status indicators. Thus, the total explanatory power for the set of items is attributable to complex interactions of positive and negative status item effects in both instances. In these cases, then, we find that the sizable positive effect of a commonly employed status background variable, father's education, on college attainment variable is offset by the countervailing influences of other social origin indicators. The original direct paths (B's) for father's education to intended major and freshman grade point average would have been .139 and .223 respectively with these other status indicator effects contolled. Had father's education been employed as the sole individual status indicator in the analysis somewhat different conclusions would have been drawn regarding the "social status" effect on these dependent variables. Thus, once again we find considerable utility in the distinction between various dimensions of social status background and their simultaneous inclusion in the model as discrete indicators.

Summary of College Attainment Processes

The results for our college attainment model were largely as anticipated, although the overall explanatory power of the model for various dependent variables was, in general, quite modest. As had been expected, most of the effects of antecedent and intervening variables on occupational attainments were mediated through educational attainments. Variables with notable effects on formal educational level included intended freshman major, academic aptitude, high school class quintile standing, and marginally, social status background. The academic aptitude item was noted to have an additional indirect effect on educational attainments through the high school class standing measure. Somewhat surprisingly, the effect of college freshman GPA on educational attainments fell below our level for retention in the reduced model.

We encountered no surprises in our discussion of the effects of antecedent background effects on the three intervening college level variables in the model. The only significant determinant of academic self-concept was freshman grade point average. Intended academic major and freshman grade point average were affected by the high school class standing, academic aptitude, and social status background variables. In both of these last two cases, it was noted that the "SES" effects subsumed both positive and negative status item paths. Thus, the direct social origins influences on the within-college and attainment variables were generally quite modest. Since aptitude influences often exceeded these social origin effects, our results are consistent with those studies indicating a greater influence for ability factors than for social background in college-level attainments (Wolfle, 1954; Folger and Nam, 1965; Spaeth, 1968, 1970).

The College Level Attainment Process: College Selectivity Influences

We are now in a position to assess the effects of college selectivity on these attainment processes. Astin Selectivity Scores, a measure of the academic competence of the college study body, are introduced to the college level attainment model in Tables 10.5 and 10.6. Once again, the first table presents the full set of path coefficients, while the second includes only the reduced form paths.

As the figures in Table 10.6 indicate, College Selectivity Scores are unrelated to a number of the variables in the college attainment model.

TABLE 10.5

COLLEGE LEVEL FULL ATTAINMENT PROCESS MODEL, WITH COLLEGE SELECTIVITY, FOR MALES

Independent Variables	Dependent Variables					
	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
Occ 1						.196
Educ 2					.452	.546
Imag 2				.087	.036	.015
Major			-.035	.111	.030	.030
GPA			.412	.126	.012	.003
Stand 2	.253	.265	.053	.135	.091	.015
Apt	.060	.207	.031	.108	.058	.027
Select	.011	-.174	.029	.190	.004	-.066
SES	.110	.190	.048	.136	.195	.132
R^2	.096	.199	.187	.227	.336	.498

"A" Coefficient For:	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
S1	-.206	-.680	.00	-.242	-.286	.189
S2	-.056	-.733	.496	.763	.179	.515
S3	1.21	1.12	-1.16	.631	-.312	.265
S4	-.393	-.046	.057	-.279	1.102	-.606
S5	-.281	.369	-.537	-.359	-.307	-.720
S6	.168	-.090	.351	.073	.154	.689

These include intended freshman major ("high performance" versus "other"), academic self-concept, and early and present occupational attainments. The absence of such direct effects is fully anticipated under the contextual effect 2-stage mediation model.

The model does, however, reflect a significant selectivity influence on two of the dependent variables in the college attainment model. These variables are freshman grade point average and level of educational attainments. College selectivity does indeed have the predicted depressant effect on freshman performance with individual aptitude and social origin measures controlled. This is consistent with the results of a number of other

TABLE 10.6

COLLEGE LEVEL REDUCED FORM ATTAINMENT PROCESS MODEL, WITH COLLEGE SELECTIVITY, FOR MALES

Independent Variables	Dependent Variables Major	 GPA	 Imag 2	 Educ 2	 Occ 1	 Occ 2
Occ 1						.204
Educ 2					.514	.548
Major				.108		
GPA			.422	.161		
Stand 2	.280	.265		.139		
Apt		.207		.111		
Select		-.174		.193		
SES	.119	.190		.136	.198	.135
R^2	.094	.199	.178	.221	.316	.493

"A" Coefficient For:	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
S1	-.202	-.680		-.243	-.272	.156
S2	.017	-.732		.780	.196	.468
S3	1.170	1.122		.604	-.242	.364
S4	-.320	-.406		-.265	1.124	-.713
S5	-.286	.364		-.383	-.237	-.654
S6	.151	-.090		.088	.030	.661

investigations of relative deprivation contextual effects in college settings (Davis, 1966; Drew and Astin, 1972; Werts and Watley, 1969; Spaeth, 1970, 1968). In the last of these studies, Spaeth (1968: 557) concluded that the extremely modest indirect social context influence on graduate school enrollment through grade point average (-.02) speaks poorly for the explanatory power, and hence utility, of the relative deprivation hypothesis. Our data indicate a college selectivity effect of essentially the same magnitude, with a two-[illegible] path of -.029 on college attainments through freshman grade point average. In contrast with Spaeth's analysis, however, our model includes a considerably stronger offsetting direct salutary effect of college selectivity on educational attainments. In our analysis this path is .193, as compared with a negligible effect of .05 in Spaeth's analysis. Drew and Nelson's recent study of these processes (1972) indicate similar offsetting influences for college selectivity regarding educational aspirations. Since college attrition is a major element in our "level of educational attainments" variable, which was not a factor in Spaeth's sample of college graduates, our data indicate that more selective colleges are better able to retain students through eventual graduation.[5] This attrition influence may account for much of the differences between the results of these two studies.

Regardless of the magnitude of these indirect depressant contextual effects, their theoretical significance cannot be adequately resolved by such criteria. The primary purpose of their inclusion in these models is to specify the dynamics by which school environment variables ultimately affect attainment process outcomes. Given this aim, their inclusion seems theoretically sound and adds to the "richness" of the portrayal of the attainment process. The discussion of the direct selectivity effect on educational attainments will demonstrate more clearly the utility of such variables in specifying the dynamics of various attainment influences.

In addition to the modest indirect depressant effect of selectivity on educational level, Table 10.6 also includes an indirect negative influence on academic self-concept. This depressant effect through relative performance scores would be -.076. Thus, the depressant influence of college selectivity on academic self-concept exceeds that on educational attainments. As in the earlier high school analysis, however, academic self-concept fails to affect any subsequent variables in this model. Nevertheless, this depressant effect of selectivity on self-concept through performance scores is exactly as hypothesized in the two-stage mediation model and quite similar to the results obtained in the high school analysis (except that in this case there is no additional direct negative context effect).

We have already mentioned the sizable direct effect of college selectivity on educational levels. While this path is somewhat larger than expected, having postulated that most of the salutary effects of ability context would also have been mediated through earlier variables in the model, it is consistent with the implications of our model of contextual effects insofar as we anticipated somewhat offsetting effects for these variables. Furthermore, such results indicate the merit of recent efforts to develop a full model of contextual effects, encompassing the various significant dimensions of, and offsetting effects for, these variables in the within-school attainment process (Meyer, 1970; Drew and Astin, 1972; Nelson, 1972).

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[5] Since the College Selectivity Score pertains to freshmen institution, these data do not distinguish between continuous enrollment, dropout and return, and transfer paths to eventual graduation.

The inclusion of the selectivity variable in the regression equation for educational attainments also serves to clarify the somewhat confusing role of freshman grade point average at this point in the attainment model that was noted in our previous discussion of the individual level model. It will be recalled that the direct freshman GPA effect on educational attainments failed to meet our requirements for retention in the reduced individual level model in Table 10.4, while the corresponding path for the high school senior class standing item was .224. With college selectivity included in the model, the path for freshman GPA on educational attainments not only is retained in the reduced model, but its magnitude actually exceeds that for the high school rank item.

This, of course, is explained by the nature of the interrelations of these three independent variables. Since high school class standing is one of the determinants of who goes where to college (to be discussed in the next section), and both variables affect educational attainments, the addition of the selectivity item reduces the high school standing-educational level path to the extent that such effects are mediated through selectivity. Thus, the direct high school class standing effect on educational attainments drops from .224 in Table 10.4 to .139 in Table 10.6.

At the same time, the inclusion of selectivity in the path model as a distinct variable controls for its suppressant effect on freshman GPA, which was observed to be of moderate magnitude at -.174. Thus, with this suppressant effect controlled, the GPA-educational attainment path rises from .089 in Table 10.3 to .161 in Table 10.6. In addition, the direct selectivity effect of .193 on educational level indicates a unique quality-composition influence not subsumed by the various individual level variables in the model.

Thus, although the inclusion of selectivity as an explanatory variable in relation to educational attainments does not have a dramatic effect on the explanatory power of the model, the proportion of explained variance increasing from .176 in Table 10.4 to .221 in Table 10.6, it does serve to specify the dynamics of these processes. In doing so it provides for a more meaningful interpretation of the various effects noted.

With the depressant effects of college selectivity on academic performance controlled, freshman performance is positively related to level of education obtained. Furthermore, part of the impact of high school class standing of educational outcomes is mediated through its effect on the quality of the college attended, so that its direct effect on educational outcomes is less marked when selectivity is included in the model as a distinct variable. It would seem then, that the inclusion of college selectivity in this model contributes considerably to an understanding of the mechanisms by which the various independent variables actually affect educational attainments. Such results attest to the importance of such effects in specifying the actual dynamics of these processes. Since we have assumed throughout that the direct effects of contextual variables should be rather modest, with the model of contextual effects assuming primarily this specification function, such results attest to the utility of including contextual variables in the study of attainment processes, despite the fact that they contribute relatively little to "explained variance."

We should note at this point that these direct "contextual" effects on educational outcomes cannot be unambiguously attributed to either the effects of student body composition or to structural features of the school's organization which happen to be associated with particular student body characteristics. While the composition interpretation seems a cogent explanation for depressant influences on performance scores, this interpretation may not seem equally satisfactory for the direct effects on actual level of educational attainments. It does seem reasonable to argue that a high aptitude student body is likely to establish an academically oriented normative milieu which encourages academic pursuits and excellence and, consequently, functions so as to retain a greater proportion of the student body through graduation and even into graduate enrollment.

On the other hand, however, it seems equally reasonable to assume that schools which attract higher quality students are structurally better able to retain them and channel their activities in academically oriented directions. Thus, they may be able to offer a wider variety of aptitude testing and guidance counseling services, more diversified and challenging course content, and better educational facilities. The quality of such educational "hardware" might affect the likelihood of retaining students through graduation and of their continuing on to graduate school. Finally, it is also possible that both student body composition and school facilities affect graduate school admissions through a kind of "halo effect." That is, quality of undergraduate institution attended may often be included among variables considered in the evaluation of graduate school applicants.

Since student body competence and the availability of various facilities are probably confounded, we cannot with certainty attribute our college selectivity effect on educational attainments to either of them. Obviously, the inclusion of measures of such educational facilities in the model itself as discrete variables would be necessary to enable us to select between these alternative explanations.

Finally, we might mention an attempted replication of Davis' Frogpond effect on the choice of a college major. We did not include the "actual college major" item in the college level model because of our desire to retain in our sample those college-goers who might have dropped out before declaring a major. The inclusion of this "senior or last year" major item reduces our college-going sample from 371 to 331. At this point, however, we can accept that attrition. It allows us to reexamine Davis' hypothesis that college selectivity operates indirectly through performance scores to reduce the likelihood of selecting "high performance career" majors.[6]

Our analysis already indicates such a negative effect of college selectivity on performance for our total male college-going subsample. This path coefficient is -.174. The corresponding path for that segment of the sample which responded to the academic major item is -.177 (not included in tables). In turn, the freshman GPA effect on senior college major is .099, with all other individual level and contextual variables except intended freshman major included in the regression equation. Consequently, the depressant selectivity effect on actual major is only -.018. Thus, although the direction of this influence is as anticipated, its magnitude is minimal. It might be noted, however, that the entire set of variables in the regression equation has only weak explanatory power regarding the senior college major item. The total variance explained by the entire set is only 4.7 percent. The only individual item Beta coefficient to exceed the .100 level is that for high school quintile standing, with a direct path of .117. It seems, then, that although our deprivation effect is not of major consequence in explaining "high performance" major selection, neither are any of the other variables included in the model.

Similarly, if the college persistence[7] item is included in the model as a dependent variable, the freshman GPA-college persistence path is .114 (again, this is with all other independent variables also included in the persistence regression equation). Since the college selectivity effect on GPA was -.174, the selectivity variable has an indirect depressant effect on college persistence through grade point average of -.020. Once again, this effect is in the direction anticipated under the "Frog-pond" relative deprivation model, but its magnitude is minimal. It might be noted that the single largest direct effect on college persistence is for the selectivity variable itself. This path is .150, considerably offsetting its depressant effect through grade point average. Thus, highly select schools appear somewhat better able to retain students through eventual graduation (not necessarily at the same school), despite the minor attrition effect associated with selectivity through the deprivation process. Finally, it might be mentioned that the entire set of independent variables has relatively weak explanatory power regarding the college persistence item. The proportion of variance explained by the regression equation is only 9.5 percent.

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[6] It will be recalled that we hesitated to posit a causal relation between intended freshman major and freshman GPA. However, freshman performance would seem to be generally antecedent to the actual selection of a major. Thus we can examine the causal effect of freshman performance on choice of major.

[7] It will be recalled that the college persistence item, described in our methodology chapter, consists of three categories: continuous enrollment through graduation; dropout and return; and, dropout but not return. This item has not been included in the full path model because of its tautological correlation with the educational attainments item.

Summary of College Selectivity Effects

The results of our analysis of college selectivity effects in the college attainment process were found to be largely consistent with the relative deprivation hypothesis developed in our model of contextual effects, while at the same time supportive of Astin's "environmental press" hypothesis (Drew and Astin, 1972). College selectivity scores did have a modest depressant effect on freshman grade point average as predicted. Since freshman GPA was, in turn, related somewhat to both academic self-concept and educational attainments in the college selectivity model, selectivity scores had a modest indirect negative impact on both of these dependent variables. It will be recalled that the two-stage contextual effect model had postulated that most of the depressant effects of college selectivity on subsequent variables would be mediated through performance scores. Although these effects were found to be extremely slight, they were entirely consistent with the two-stage model.

It might be noted that we obtained no direct depressant effect for selectivity on academic self-concept, as had been found for average aptitude levels in the high school analysis. In the latter case, we speculated that this unmediated negative influence might be a function of classroom cues pertaining to academic self-evaluations which are not strictly tied to the formal grading system. These cues might include such things as teacher and peer comments on the quality of one's classroom participation and academic performance, tutorial requests by peers, comparative evaluations of the quality of others' classroom contributions relative to one's own, and so forth. This difference in direct aptitude composition effects on self-evaluations at the high school and college levels might indicate that in the latter case self-conceptions are much more closely tied to the formal evaluative system, while in the former instance there is a wider variety of cues providing feedback on the quality of one's performance. Indeed, with generally larger student bodies and class enrollments at the college level, this explanation seems entirely reasonable, perhaps reflecting the presumed "impersonality" of college education.

While the depressant consequences of college selectivity were as hypothesized, we also observed a sizable direct salutary impact of selectivity on educational attainments. Thus, the higher the ability composition of the student body, the higher the individual's level of formal educational attainments tends to be. It is impossible to determine whether these outcomes are attributable to student body composition influences per se, or to various organizational features of schools which would tend to be associated with such student body ability levels. Much like with the influence of college-preparatory enrollment in high school, "quality" colleges are likely to be more "geared" toward graduate school planning and preparation than are less select institutions. Regardless of which explanation is actually the more correct, and it may actually be that both elements are of consequence, these results are consistent with recent studies indicating somewhat offsetting effects for student body composition characteristics at different points in the educational attainment process (Drew and Astin, 1972; Nelson, 1972; Meyer, 1970).

Since we had no social status composition measure at the college level, we could not attempt a replication of our high school analysis which successfully separated the aptitude and social origin dimensions of student body composition and examined their differential effects. Although we have cited considerable evidence indicating the minimal importance of individual status background characteristics on college attainments given enrollment, this offers no assurance that aggregate status background effects are similarly negligible. Although this might be hypothesized to be the case, the issue can only be resolved empirically.

The inclusion of college selectivity in the regression equation for educational attainments also served to specify the nature of high school and freshman performance effects on educational level. With selectivity scores controlled, the freshman GPA path increased somewhat, while that for high school class standing declined. These changes resulted, of course, from the fact that the depressant effect of selectivity on GPA had been removed and that college selectivity actually mediates some of the impact of high school class standing on educational attainments. Thus, although the selectivity scores contributed only modestly to the "explained variance" in the model, their inclusion provided a considerably more meaningful interpretation of the dynamics of these processes.

Finally, we were able to briefly reexamine Davis' Frogpond hypothesis regarding the depressant effect of college selectivity on the selection of a college major through performance scores. Although the two-stage depressant effect was in the anticipated direction, its magnitude was extremely slight. Thus, Davis' Frogpond hypothesis regarding the actual selection of a college major received little support in these data; however, it was also noted that none of the variables in the college level model had a substantial impact on the major selection item. Essentially the same results were obtained when college persistence was examined as the dependent variable in the "Frogpond" model.

Having completed our discussion of selectivity influences on the college attainment process, we can now turn to the final stages of our college-level analysis. This involves an examination of any enduring high school student body composition and curriculum membership effects on college attainments. This analysis follows next.

The College Attainment Process: Enduring High School Influences

Tables 10.7 and 10.8 present the full and reduced form path coefficients for the complete college-level attainment process model with the school-wide high school social origin and academic aptitude composition measures and curriculum enrollment items included as additonal exogenous variables. The inclusion of the latter item is a consequence of our discovery of unique curriculum effects on a number of the attainment process variables in the high school level models. Although some 64 percent of the respondents in this college-going subsample were enrolled in a high school college preparatory program, there is enough variation in this item to warrant its inclusion in our college-level analysis as a distinct variable. Only 43 percent of the youth in our high school level analysis were enrolled in such programs (45 percent if the nonrespondents are excluded from the "other" category). In light of the confounding of curriculum and composition in our within-curriculum contextual measures, and our subsequent conclusion that most of their effects above those noted for the school-wide composition measures are to be attributed to the curriculum element, the within-curriculum contextual measures will not be employed in this analysis.

The path coefficients in Tables 10.7 and 10.8 will permit us to assess any direct effects of high school composition and curriculum on college attainments and their indirect consequences through affecting college selectivity levels. Thus, the Astin College Selectivity Index is treated as a dependent variable in these tables, with not only the various high school composition measures entered into its regression equation, but the individual level academic aptitude, social origins, and high school class standing items as well. To the best of our knowledge, this question of contextual influences in the transition across educational environments has not been previously explored in the contextual effect literature.

An inspection of the paths retained in the reduced form model in Table 10.8 reveals a number of "carry-over" influences from the high school environment and experiences. Since these additional effects produce only minor changes in the college-level and background influences already reviewed in earlier models, our discussion at this point will focus primarily on the apparent enduring high school influences.

The first of these effects to be retained in the reduced model is for curriculum enrollment on early occupational attainments. This direct path of .168 implies that participation in a college-preparatory high school program has an eventual modest salutary impact on early job status even among college-goers. Since this effect was not mediated through

TABLE 10-7

COLLEGE LEVEL FULL ATTAINMENT PROCESS MODEL, WITH COLLEGE SELECTIVITY AND HIGH SCHOOL CONTEXTUAL VARIABLES, FOR MALES

Independent Variables	Dependent Variables						
	Select	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
Occ 1							.196
Educ 2						.432	.548
Imag 2					.067	.010	.015
Major				-.049	.102	.015	.029
GPA				.403	.123	.016	.005
Stand 2	.294	.237	.272	.061	.157	.096	.009
Apt	-.009	.059	.208	.011	.095	.049	.026
Select		.000	-.194	.004	.155	-.014	-.059
Con 1	-.019	-.055	-.072	-.008	-.029	-.047	.017
Con 2	.308	.000	.110	.040	.118	.046	-.043
Curric	.027	.098	.020	.148	.078	.158	.014
SES	.156	.100	.198	.071	.114	.179	.137
R^2	.209	.106	.205	.209	.242	.360	.499

"A" Coefficient For:	Select	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
S1	.486	-.280	-.621	.014	-.210	-.335	.161
S2	.582	-.010	-.707	.337	.884	.223	.505
S3	-.691	1.178	1.01	-1.193	.516	-.492	.263
S4	.742	-.409	-.495	.028	-.656	1.10	-.527
S5	.058	-.389	.439	-.182	-.175	-.302	-.761
S6	-.428	.210	-.152	.196	-.044	.156	.710

educational attainments or any of the various within-college variables, it apparently cannot be attributed to any of the intervening collegiate experiences assessed in our model. With early occupational status being a significant determinant of present occupational attainments, this effect also implies a modest indirect influence of curriculum on present job status. The effects for the two high school student body composition

TABLE 10-8

COLLEGE LEVEL REDUCED FORM ATTAINMENT PROCESS MODEL, WITH COLLEGE SELECTIVITY AND HIGH SCHOOL CONTEXTUAL VARIABLES, FOR MALES

Independent Variables	Dependent Variables						
	Select	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
Occ 1							.204
Educ 2						.443	.548
Major					.108		
GPA				.411	.154		
Stand 2	.294	.270	.265			.122	
Apt			.207		.098		
Select			-.174		.159		
Con 2	.302				.124		
Curric		.096		.145		.168	
SES	.157	.102	.190		.117	.183	.135
R^2	.208	.102	.199	.199	.213	.356	.493

"A" Coefficient For:	Select	Major	GPA	Imag 2	Educ 2	Occ 1	Occ 2
S1	.497	-.245	-.680		-.171	-.356	.156
S2	.560	.010	-.732		.857	.219	.468
S3	-.675	1.178	1.122		.549	-.410	.364
S4	.745	-.481	-.406		-.617	1.08	-.713
S5	.064	-.294	.364		-.129	-.323	-.654
S6	-.433	.196	-.090		-.069	.186	.661

measures on occupational attainments were both quite modest and almost exactly offsetting. Hence, these were excluded from the reduced model.

The only high school level composition variable having a continuing effect on actual level of educational attainments is the student body social status composition item. Its path in the reduced model is .124, which corresponds quite closely to its effect in the high school level analysis of the previous chapter. With educational level being the major determinant of both early and present occupational attainments in these models, the direct effect of high school student body status composition on educational attainments indicates a modest indirect effect on the two occupational attainment variables. These two indirect paths through educational level would be .055 and .068 for first and present occupation respectively in the reduced model. In the full model, the effect for the curriculum item is positive, but its magnitude, .078, is not sufficient to warrant its retention in the reduced model.

Curriculum enrollment, on the other hand, is found to have a notable impact on the college-level academic self-concept index. The direct path in the reduced form model is .145. Previously freshman GPA had been the only determinant of self-concept retained in the reduced form college model. This curriculum effect is independent of any influence through performance scores, thus implying a direct salutary consequence of having participated in a college preparatory program. Such participation appears to elevate one's academic self-concept somewhat, probably through promoting a greater sense of commitment to and identification with academic pursuits. In this case, as in most others, the two student body composition measures are unrelated to the dependent variable.

Only one of the three high school level variables appears to have a significant effect on intended major as a freshman in the full model presented in Table 10.7. This effect is, once again, for the curriculum enrollment item, but the magnitude of its influence in this case is minimal. The direct curriculum-major choice path in the full model is only .098. Consequently, the evidence for an even slight high school curriculum enrollment effect on intended college major is not entirely satisfactory.

Examining freshman grade point average as our dependent variable, we find that once again only one of the three high school variables has a significant direct effect on within-college attainments in the full model in Table 10.7. In this case, the high school variable is the school-wide social status origins composition measure. But this path coefficient is somewhat smaller in the reduced model. Thus, the direct status composition-freshman GPA path declines from .110 in Table 10.7 to .068 when other non-significant effects are excluded. This reduction in path coefficients can be attributed to the origin measure's having picked up some of the suppressant effect of aptitude composition, which was deleted in the reduced model. The aptitude composition-GPA path in Table 10.7 is -.072, more than half the magnitude of the "significant" positive status composition-GPA path of .110. Thus, the confounding of these two offsetting effects in the reduced model accounts for the reduction in the status composition-freshman performance linkage. Since this aptitude composition effect would fall below our .100 cut-off, it has been excluded from Table 10.8 also.

Finally, we come to the context transition question. Do high school student body composition characteristics exert an influence on the quality of college attended? This issue may be addressed by inspecting the various effects on college selectivity itself. As the figures in Table 10.8 indicate, only one of the high school level composition-curriculum variables seems to have any implications for the selectivity of one's first college. The status composition-college selectivity path is the only one of the three of interest at this point which meets our criteria for retention in the reduced model. Indeed the path coefficient of .302 indicates a sizable influence for high school student body status composition. Once again, it must be recalled that this effect is with the various individual level influences of academic ability and social status background controlled.

Although these figures indicate that the status characteristics of one's high school student body do have a notable effect on the quality of the college one eventually attends, the substantive explanation of this relationship is still an open issue. Our data cannot distinguish between the direct compositional influence of aggregate student body social status characteristics and the effects of school organizational features which would be associated with such student body composition variables. Thus, just as with our college-selectivity-educational attainments relationship discussed earlier, at least two alternative substantive interpretations of this linkage seem feasible. The composition explanation would posit the development of normative expectations regarding the quality of the college one should attend. These expectations could be conveyed to the student's parents either by their children or directly through contact with other parents in the school or community. Whatever the specific mechanisms, students from high status schools are more likely to attend higher quality colleges.

The more structural explanation would rely on the assumption of better and more extensive guidance counseling facilities and other school organizational features which serve to channel students into higher quality colleges. The quality of the staff, a greater variety of program offerings, and the availability of more sophisticated educational "hardware" in higher status schools might all be hypothesized to stimulate both academic interest and the desire for a "quality" college education. School characteristics themselves could account for the status composition-college selectivity linkage through either of these mechanisms.

Finally, there are a number of "artificial" explanations for such results. These, of course, are the various individual level explanations which have often been posited as the "true" explanation of contextual effects. The first of these would involve the "uncontrolled individual level variation" hypothesis. The only way to counter this position in this case is to present to the reader the variety of individual level variables which have been controlled in the analysis and allow him to reach his own conclusions regarding their adequacy.

A second such argument would pertain to the peculiar nature of the seemingly "deviant cases" in these relationships. Thus, low status and aptitude youth are somewhat more likely to attend a high quality college if they attended a high status high school. Perhaps the very presence of such students in these schools attests to their "atypicality." Parents of such students may, for a variety of reasons, be more strongly motivated to see their children get a quality education and, hence, make considerable efforts to send them to more select colleges. Of course, for this argument to hold, the converse should also be true. That is, high status and aptitude youth in relatively low status schools are less likely to attend quality colleges. Is this also explicable in terms of the peculiar motivational traits of such students' parents?

Obviously, we are not in a position to resolve this question. Indeed, we cannot reject any of these competing explanations with complete certainty. The positive contextual effect results seems considerably more subject to such alternative explanations than would be the case for the depressant aptitude composition effects. In the latter case, the alternative explanations would all be likely to predict positive effects. Thus, we find ourselves at the following point: the contextual effect is manifest as had been anticipated and there appear to be sound theoretical reasons for expecting such an influence; our variety of individual level controls are quite extensive, but we have no way of concluding with certainty that pertinent uncontrolled individual level variation is not confounded with the contextual effect; finally, we have absolutely no means at our command to assess the "deviant individual" explanation. We might note, though, that neither of these competing explanations would seem sufficient to account for our previously obtained depressant aptitude contextual effect. This being the case, it may be arguable that if one contextual effect appears "valid," it increases our confidence that others are similarly meaningful. Concluding this, of course, does not permit us to distinguish between the "school structure" and "status composition" explanations for the composition-selectivity link. The Coleman Report high school level analysis (1966), however, controls for a variety of such "school structure" variables which did not eliminate their status composition effects.

Before moving on, it might be mentioned that both individual level academic aptitude (operating through high school class standing) and status background have modest effects on college selectivity scores.

At this point we can address ourselves to the matter of a "relative deprivation" effect in the transition between educational settings. In our introductory chapter we noted that the effects of a linear difference score between high school and college selectivity measures would be subsumed under the main effects for these variables in this model. It would be impossible to estimate simultaneously parameters for both main effects and the difference term, since the latter is an exact function of the former, thereby providing but two unique equations for the estimation of three unknowns. Proceeding under the assumption that main effects are more likely than interactions effects, we have examined the main effects for these two aptitude composition measures in the previously discussed Table 10.8. The results presented in Tables 10.7 and 10.8 indicate that this difference effect would be inconsequential. None of the direct effects for high school aptitude composition on any of the college analysis variables was significant, including the high school aptitude-college selectivity path. The apparent unimportance of high school ability contexts for any college attainment variables makes it unlikely that an ability difference score would indicate any dramatic effect. In any event, any such linear difference effects would be subsumed under the college selectivity main effects manifest in Tables 10.7 and 10.8. Since all of these effects are quite meaningful and substantively interpretable as selectivity effects, there would seem to be no advantage in positing the existence of a confounded difference effect. Had the main effects of high school aptitude composition proven to be significant, the further pursuit of this question might have been deemed worthwhile. As it is, all of our results can be cogently interpreted in terms of the main effects of variables included in the various models.

Summary of the "Enduring High School Influences" Analysis

The "carry-over" effects of high school contextual and curriculum enrollment variables into the college attainment model were generally found to be modest. Only five significant paths for all three high school items were retained in the reduced college model. Three of these effects were for the curriculum enrollment item, with the direct paths to first occupational attainments, academic self-concept, and intended freshman major meeting our criteria for retention in the reduced model. Such curriculum effects on college-level processes would appear to function subjectively through a heightened commitment to, and identification with, academic pursuits. The enduring direct effect on early occupational attainments is not so readily explicable. It is possible that enrollment in a college-preparatory curriculum either has some modest "certification" value in the job-market, facilitates the making of eventually useful job placement contacts, or provides guidance counseling that has eventual implications for the educational certification-career initiation transition. Conversely, enrollment in a non-college preparatory high school program might provide information and low occupational status alternatives that might not be of interest to academically oriented youth.

The other two significant high school effects were for social status composition on years of education obtained and college selectivity. The latter path was the largest of the enduring high school effects noted in the model. It was mentioned that the interpretation of this effect was open to a number of competing explanations. These could involve direct composition influences on the quality of college attended, the influence of various high school organizational characteristics on the transition to college, or various artifactual interpretations involving uncontrolled individual level variations. While the artifactual explanations could not be rejected with any finality, we felt that the theoretical cogency of the others and the results of our earlier aptitude composition analysis, in conjunction with the quality of the individual level controls employed, together provide considerable confidence in either the compositional or organizational interpretations.

Finally, we observed that none of the high school aptitude composition paths in the college level model were significant. Given the apparent inconsequence of high school aptitude composition main effects for college level outcomes, it is unlikely that any linear difference effect between high school and college ability composition levels would have notable implications for college level attainments. Any such difference effects would be subsumed under the college selectivity main effects in these models. Since these effects were essentially unchanged when high school aptitude composition was added to the model, and since all such effects are readily interpretable as selectivity main effects, little benefit would seem to be derived from positing an aptitude transition deprivation effect. While the aptitude composition effects in the within-high school model were themselves extremely modest, their impact does appear to be restricted to such within-high school processes.

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